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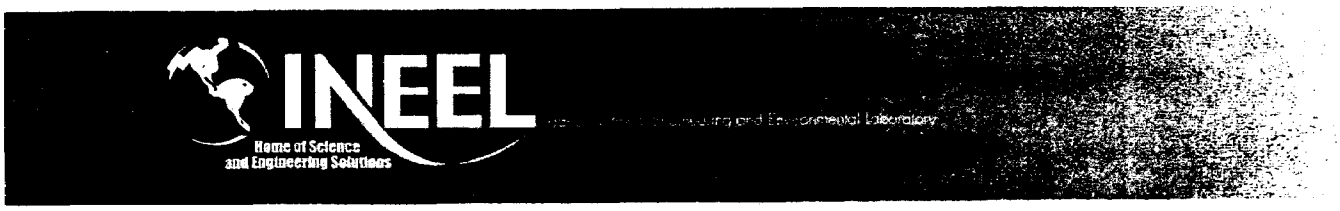
Revision 0
August 2004

U.S. Department of Energy
Idaho Operations Office

Field Sampling Plan for the Operable Units 6-05 and 10-04 Remedial Action, Phase II



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Project No. 23368

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Prepared for the
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ABSTRACT

This Field Sampling Plan outlines the collection and analysis of samples in support of Phase II of the Waste Area Group 10, Operable Units 6-05 and 10-04, remedial action, which is being performed in accordance with the *Record of Decision, Experimental Breeder Reactor-I/Boiling Water Reactor Experiment Area and Miscellaneous Sites, Operable Units 6-05 and 10-04*.

Phase II addresses the remedial actions at five soil sites that are contaminated with trinitrotoluene, Royal Demolition Explosive, and/or 1,3-dinitrobenzene, including the Fire Station II Zone and Range Fire Burn Area, Experimental Field Station, Land Mine Fuze Burn Area, National Oceanic and Atmospheric Administration Area, and the Naval Ordnance Disposal Area. Contaminated soil and explosive fragments will be removed during Phase II activities from the five Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites and dispositioned at the Idaho National Engineering and Environmental Laboratory (INEEL). Explosive fragments will be detonated at the Mass Detonation Area and contaminated soil will be disposed of at the INEEL CERCLA Disposal Facility or other approved disposal facility (as appropriate).

Field screening analyses will be performed at the sites to direct the excavation activities. If areas are identified as exceeding the remedial action goals, additional selective excavation will occur to remove the contaminated soil. Contaminated soil will be removed and remaining soil will be screened through an iterative process until field screening results show that contaminant concentrations are at or below the remedial action goals for the respective site. Following completion of all excavation activities, confirmation samples will be collected for analyses using field test kits to demonstrate that contamination has been removed to levels below the remedial action goals with a subset of the samples sent for laboratory analyses to determine the correlation with the field test kits.

CONTENTS

FIGURES

TABLES

ACRONYMS

ARAR	applicable or relevant and appropriate requirement
AWM	amber wide-mouth
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
COC	contaminant of concern
CSA	CERCLA storage area
CWSU	CERCLA waste storage unit
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
DOT	U.S. Department of Transportation
DQO	data quality objective
DS	decision statement
EPA	U.S. Environmental Protection Agency
FSP	field sampling plan
GDE	guide
HASP	health and safety plan
HQ	hazard quotient
ICDF	INEEL CERCLA Disposal Facility
ICP	Idaho Completion Project
ID	identification
INEEL	Idaho National Engineering and Environmental Laboratory
MCP	management control procedure
MDA	Mass Detonation Area
NOAA	National Oceanic and Atmospheric Administration

NODA	Naval Ordnance Disposal Area
NPG	Naval Proving Ground
OU	operable unit
PPE	personal protective equipment
ppm	parts per million
PRD	program requirements document
PQL	practical quantitation limit
PSQ	principal study question
QA	quality assurance
QAPjP	quality assurance project plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	Royal Demolition Explosive
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
SAM	Sample and Analysis Management
SAP	sampling and analysis plan
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
TNT	trinitrotoluene
UCL	upper confidence limit
UXO	unexploded ordnance
WAG	waste area group
WGS	Waste Generator Services
WM	wide-mouth

Field Sampling Plan for the Operable Units 6-05 and 10-04 Remedial Action, Phase II

1. OVERVIEW

The sampling and analysis plan (SAP) for the Idaho National Engineering and Environmental Laboratory (INEEL) Waste Area Group (WAG) 10, Operable Units (OUs) 6-05 and 10-04, Phase II remedial action is comprised of two parts:

1. Field sampling plan (FSP)

2. Quality assurance project plan (QAPjP).

These plans have been prepared in accordance with 40 *Code of Federal Regulations* (CFR) 300, "National Oil and Hazardous Substances Pollution Contingency Plan"; guidance from the U.S. Environmental Protection Agency (EPA) on the preparation of SAPs; and Idaho Completion Project (ICP) Management Control Procedure (MCP) -9439, "Environmental Sampling Activities at the INEEL." The FSP describes the field sampling activities that will be performed, while the QAPjP details the processes and programs that will be used to ensure that the data generated are suitable for their intended uses. The governing QAPjP for this sampling effort will be the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Deactivation, Decontamination, and Decommissioning* (DOE-ID 2004a). This document is incorporated herein by reference. Work control processes will follow formal practices in accordance with the communicated agreement between the appropriate site area directors and the ICP manager of projects.

1.1 Field Sampling Plan

The remedial action for WAG 10, OUs 6-05 and 10-04, is divided into four phases. Phase I consists of developing and implementing institutional controls at OU 10-04 sites and developing and implementing INEEL-wide plans for both institutional controls and ecological monitoring. Phase II will remediate sites contaminated with trinitrotoluene (TNT), Royal Demolition Explosive (RDX), and/or 1,3-dinitrobenzene. Phase III will remediate lead contamination at a gun range, and Phase IV will remediate hazards associated with unexploded ordnance (UXO). The purpose of this FSP is to guide the collection and analysis of samples required to confirm that the remedial action objectives for Phase II have been met by the remedial action. The project is being conducted in accordance with the requirements set forth in the *Record of Decision, Experimental Breeder Reactor-I/Boiling Water Reactor Experiment Area and Miscellaneous Sites, Operable Units 6-05 and 10-04* (DOE-ID 2002).

Phase II activities will require the removal or isolation of explosives (TNT and RDX) found on five sites within the INEEL and remediation of soil found at the sites that are contaminated with chemical compounds (principally TNT, RDX, and 1,3-dinitrobenzene) during explosive tests. The five sites located inside the Naval Proving Ground (NPG) include the following:

1. Fire Station II Zone and Range Fire Burn Area

2. Experimental Field Station

3. Land Mine Fuze Burn Area

4. National Oceanic and Atmospheric Administration (NOAA)

5. Naval Ordnance Disposal Area (NODA).

1.1.1 Field Sampling Objectives

The purpose of this FSP is to guide the collection and analysis of field screening data and soil samples at five Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites in OUs 6-05 and 10-04 at the INEEL. The primary objective of this field sampling effort is to confirm that contaminant concentrations at the five CERCLA sites are below the remedial action goals defined in the Record of Decision (ROD) (DOE-ID 2002). At the conclusion of the remedial action, confirmation samples will be collected at all remediated sites to demonstrate compliance with the remedial action objectives as stated in the ROD (DOE-ID 2002).

1.1.2 Other Documentation

The *Remedial Design/Remedial Action Work Plan for Operable Units 6-05 and 10-04, Phase II* (DOE-ID 2004b) outlines the activities required for remediation of the five TNT/RDX contaminated sites. The health and safety plan (HASP) prepared for this project, *Health and Safety Plan for the Waste Area Group 10 Remedial Actions at Trinitrotoluene and Royal Demolition Explosive-Contaminated Sites* (ICP 2004), covers the activities associated with remediation of the five soil sites as well as activities associated with the recovery and disposal of ordnance that might be encountered during the course of the remedial action.

1.2 Project Organization and Responsibility

The organizational structure for this work reflects the resources and expertise required to plan and perform the work, while minimizing risks to worker health and safety. The HASP (ICP 2004) provides the job titles of the individuals who will be filling the key roles and lines of responsibility and communication.

2. SITE BACKGROUND

2.1 Site Description

Located 51 km (32 mi) west of Idaho Falls, Idaho, the INEEL is a government-owned, contractor-operated facility managed by the U.S. Department of Energy Idaho Operations Office (DOE-ID) (Figure 2-1). Occupying 2,305 km^2 (890 mi^2) of the northeastern portion of the Eastern Snake River Plain, the INEEL encompasses portions of five Idaho counties: Butte, Jefferson, Bonneville, Clark, and Bingham.

As shown in Figure 2-2, WAG 10 is comprised of miscellaneous surface sites and liquid disposal areas throughout the INEEL that are not included within WAGs 1 through 9. Remedial action is required for five sites contaminated with TNT and RDX: (1) TNT at the Fire Station II Zone and Range Fire Burn Area, (2) the Experimental Field Station, (3) Land Mine Fuze Burn Area, (4) NOAA soil sites, and (5) RDX at the Fire Station II Zone and Range Fire Burn Area, NOAA, and the NODA Area 2 soil sites. In addition, soil at the Experimental Field Station and NOAA sites is contaminated with 1,3-dinitrobenzene. Figure 2-3 shows the location of the five TNT/RDX contaminated sites within the NPG. The following sections describe the contaminated soil sites that will require sampling under this FSP.

2.1.1 Fire Station II Zone and Range Fire Burn Area

The Fire Station II Zone and Range Fire Burn Area is located adjacent to the Fire Station II training site for the INEEL Fire Department (see Figure 2-4). It is located just east of Lincoln Boulevard at Mile Marker 5 and includes an area approximately 13 ha (33 acres) in size; however, the actual contamination is restricted to approximately 750 m^2 (900 yd^2). Early NPG activities at the site included some low-order bomb detonations that scattered UXO and pieces of explosives over several areas of the site. In the early 1970s, the entire 320-ha (800-acre) area was engulfed in a range fire that reportedly burned some UXO. More detailed information pertaining to the Fire Station II Zone and Range Fire Burn Area can be found in the *Comprehensive Remedial Investigation/Feasibility Study for Waste Area Groups 6 and 10 Operable Unit 10-04* (DOE-ID 2001).

The Fire Station soils site was considered to represent four separate areas of contamination. For Area 1 (see Figure 2-4), the risk evaluation indicated a risk to ecological receptors from TNT. For Area 2 (see Figure 2-4), the risk evaluation indicated a risk to ecological receptors from RDX. Areas 3 and 4 have no contaminants of potential concern retained for further evaluation in the ecological risk assessment.

2.1.2 Experimental Field Station

The Experimental Field Station is located within the NPG gunnery range approximately 9.7 km (6 mi) downrange and northeast of the Central Facilities Area (CFA) -633 NPG firing site and approximately 0.4 km (0.25 mi) west of the Big Lost River channel (see Figure 2-5). The area of the site is approximately 2 ha (5 acres) (DOE-ID 2001); however, the actual contamination is restricted to approximately 510 m^2 (610 yd^2). This site includes multiple craters within which a variety of explosive tests were conducted. The site is known to contain UXO, pieces of explosives, structural debris, and soil contamination. More detailed information about the Experimental Field Station can be found in the Comprehensive Remedial Investigation/Feasibility Study (RI/FS) (DOE-ID 2001).

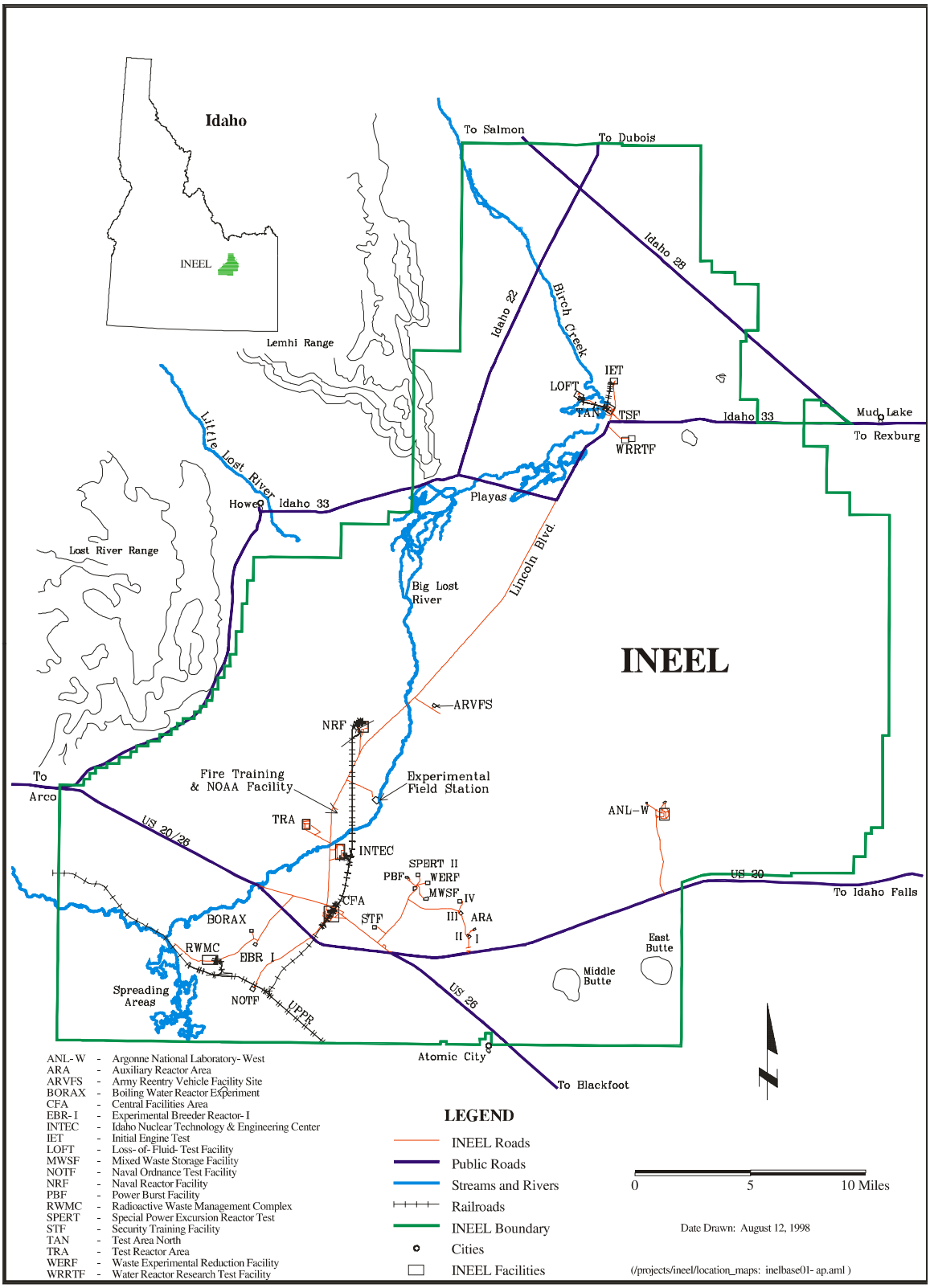
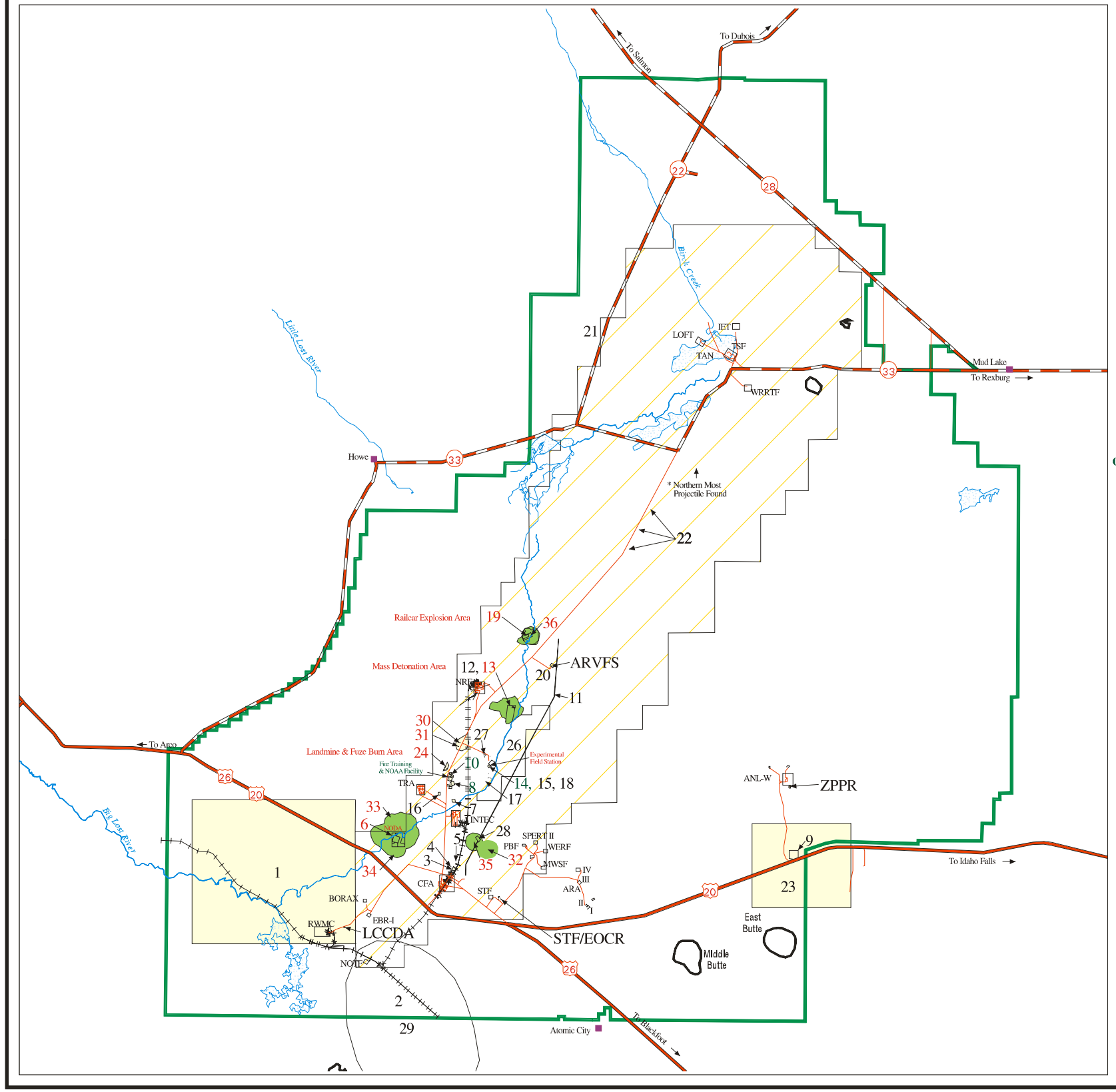


Figure 2-1. Idaho National Engineering and Environmental Laboratory.



INEEL WAG-10 CERCLA SITES

KEY TO CERCLA Sites

Operable Unit	Site Code	Action	Description
10-00	ARVFS-01	No Action	ARVFS Containers of Contaminated NaK
10-00	ARVFS-02	No Action	ARVFS Tank Containing Low-level Radioactive Waste (under white building)
10-00	EOCR-02	No Action	EOCR Injection Well
10-00	EOCR-03	No Action	EOCR Oxidation Pond
10-00	EOCR-04	No Action	EOCR Septic Tank
10-00	EOCR-05	No Action	EOCR Blowdown Sump (EOCR 719)
10-04	STF-01	RI/FS-NSI	STF-601 Sumps and Pits
10-00	EOCR-01	No Action	EOCR Leach Pond
10-01	LCCDA-01	Track 2	LCCDA Old Disposal Pit (west end)
10-01	LCCDA-02	Track 2	LCCDA Limestone Treatment and Disposal Pit (east end)
10-01	LCCDA-EZ	Track 2	Exclusion Zone for LCCDA-01 and LCCDA-02
10-00	ZPPR-01	No Action	APPR Disposal Pit (outside ANL-W fence)
10-04	STF-02	RI/FS-NSI	STF Gun Range

KEY TO ORDNANCE AREAS

Red text indicates areas with live Unexploded Ordnance (UXO)
Green text indicates areas with TNT and/or RDX soil contamination

1 - Arco High Altitude Bombing Range
2 - Naval Ordnance Test Facility (NOTF) (Vietnam Era) and
3 - CFA-633 Naval Firing Site and Downrange Area
4 - CFA Gravel Pit
5 - CFA Sanitary Landfill Area
6 - Naval Ordnance Disposal Area (NODA) (partially cleared)
7 - Explosive Storage Bunkers - North of ICPP
8 - National Oceanic & Atmospheric Administration (NOAA)
9 - Twin Buttes Bombing Range (partially cleared)
10 - Firestation II Zone and Range Fire Burn Area
11 - Anaconda Power Line
12 - Old Military Structures
13 - Mass Detonation Area
14 - Dairy Farm Reventments
15 - Experimental Field Station
16 - Unexploded Ordnance East of TRA
17 - Burn Area South of Experimental Field Station
18 - Igloo-Type Structure Northwest of Experimental Field Station
19 - Railcar Explosion Area
20 - Unexploded Shell East of ARVFS
21 - Juniper Mine
22 - Projectiles Found Near Mile Markers 17, 18 and 19
23 - Rifle Range
24 - Landmine and Fuze Burn Area
25 - Ordnance and Dry Explosives East of the Big Lost and North of NRF (Same as Railcar Site #19)
26 - Zone East of the Big Lost River
27 - Dirt Mounds Near the Experimental Field Station, NOAA, and NRF
28 - Craters East of ICPP
29 - Big Southern Butte
30 - Assessed Projectile Detonation Area
31 - Assessed Land Mine Detonation Area
32 - 4 Live 5" Anti Aircraft Common Projectile
33 - 30 Live 5" Anti Aircraft Common Projectile
34 - 19 Live 5" Anti Aircraft Common Projectile and 4 Live Fuzes
35 - Frag and RDX explosives found in and around crater
36 - Crater with 12 plus projectiles and chunks of RDX explosives
* - Northern Most Projectile Found (16" inert)

LEGEND

- U.S. Highways
- State Highways
- Paved or Light-Duty Roads
- RailRoad Tracks
- Rivers and Streams
- Buttes
- INEEL Boundary
- Spreading Areas and Playas
- Live Ordnance Areas
- Assessed or Cleared Ordnance Areas
- Down Range Ordnance Area
- Cities and Towns

N

0 2 4 6 8 Miles

Project: N/A
Map Requestor: Tom Haney
GIS Analyst: Dan Mahnami
Date Drawn: June 13, 2001
Disclaimer: Live unexploded ordnance mapped with Trimble Pro XRS sub-meter GPS. CERCLA Sites located via convential site survey and survey grade Trimble 4800 GPS equipment.
Path: /projects/ineel/wag10_cerclasites/
File Name: cercla_sites_2001-bl_v1
Control #: N/A

Idaho National Engineering & Environmental Laboratory

Figure 2-2. Location of Waste Area Group 10 Comprehensive Environmental Response, Compensation, and Liability Act sites at the Idaho National Engineering and Environmental Laboratory.

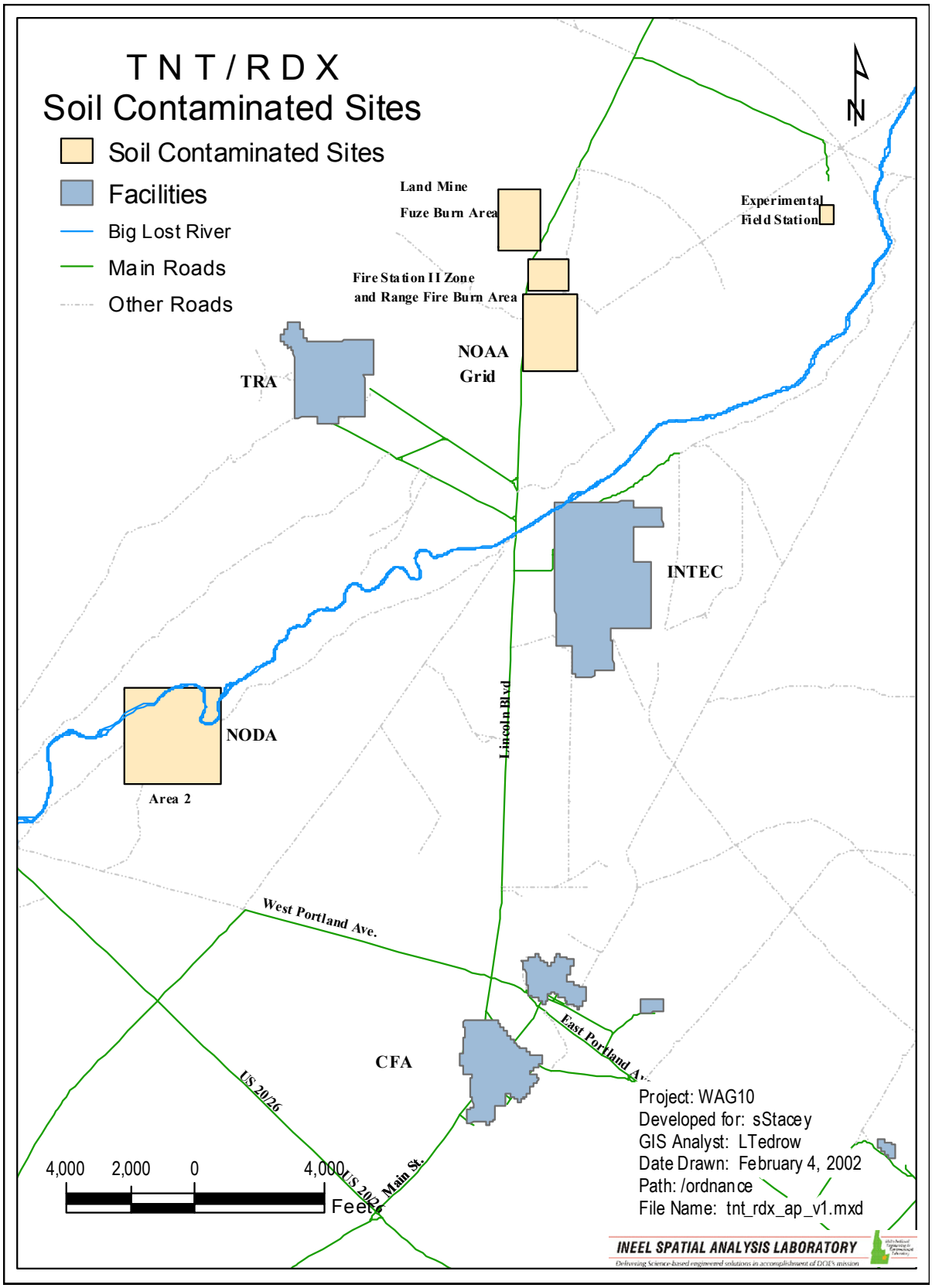


Figure 2-3. Location of the trinitrotoluene/Royal Demolition Explosive soil-contaminated sites.

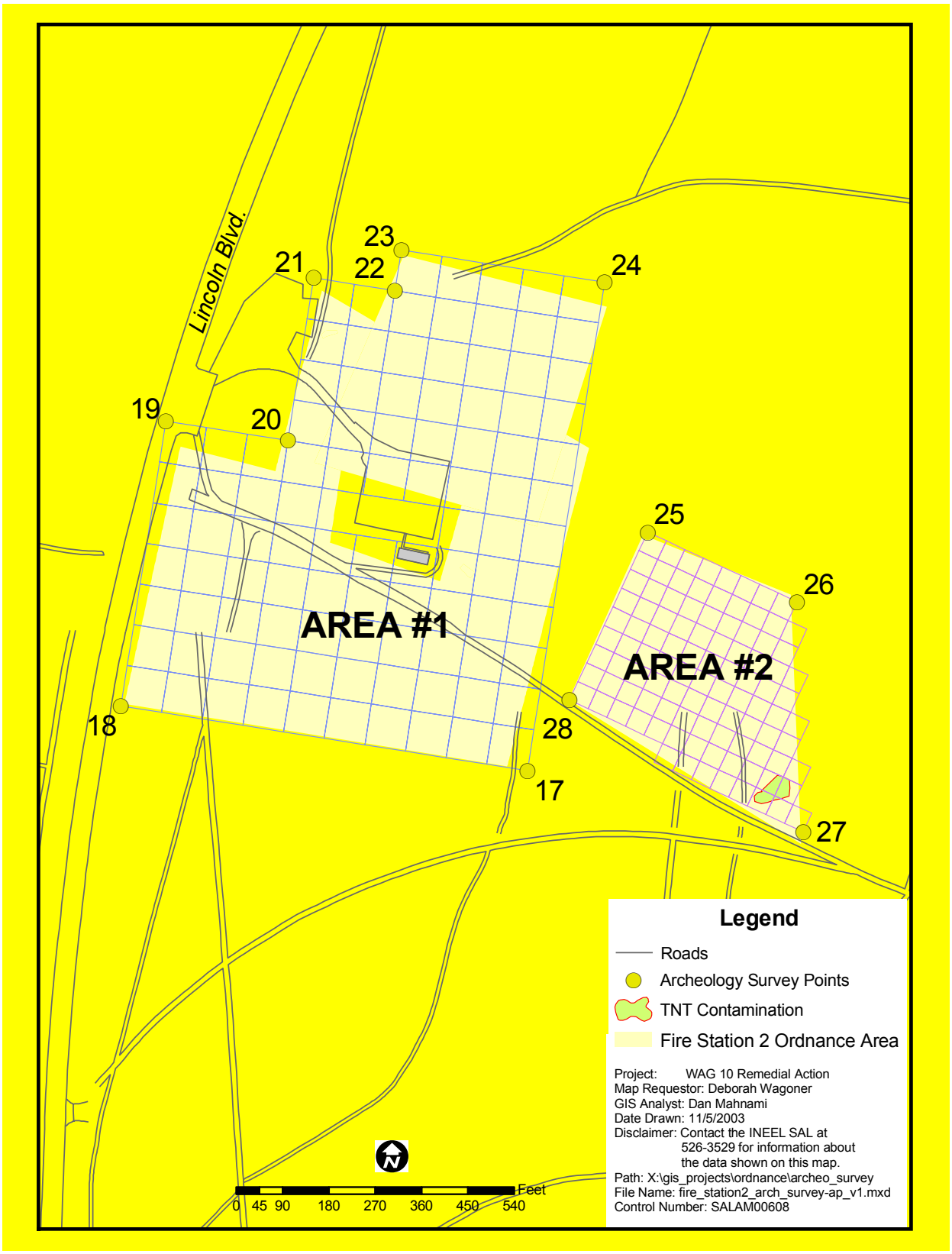


Figure 2-4. Location of Fire Station II Zone and Range Fire Burn Area.

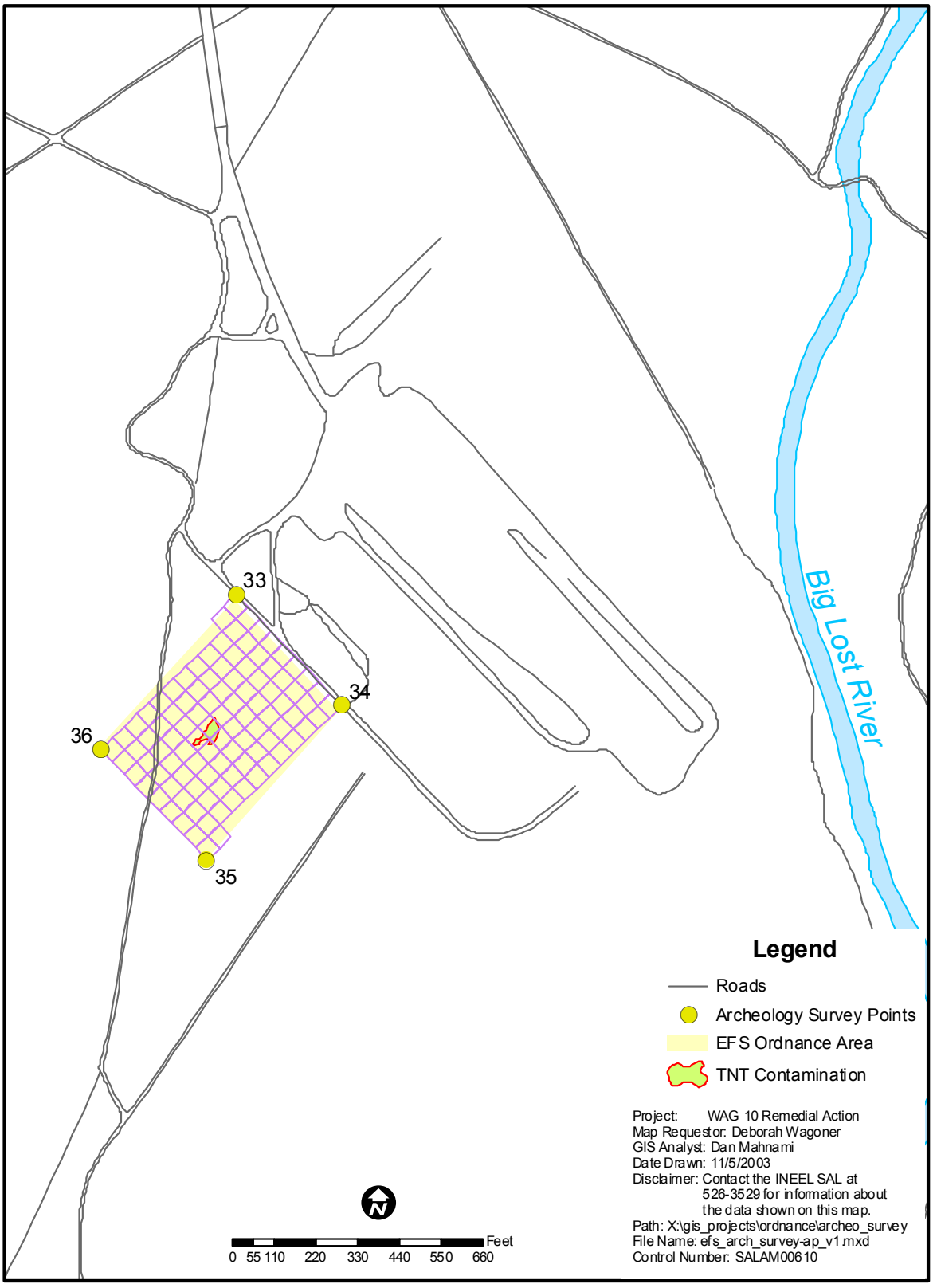


Figure 2-5. Location of the Experimental Field Station.

2.1.3 Land Mine Fuze Burn Area

The Land Mine Fuze Burn Area is 0.8 km (0.5 mi) west of Lincoln Boulevard and approximately 0.8 km (0.5 mi) north of the Fire Station II training area (Mile Marker 5) (see Figure 2-6). The site consists of approximately five separate ordnance disposal locations in an 8.1-ha (20-acre) area between a meander of a former Big Lost River channel and an old abandoned irrigation canal that was hand dug in the early 1900s (DOE-ID 2001). Based upon visual observation, the contaminated area of the site is restricted to a few square meters in a single location. As described in the *Preliminary Scoping Track 2 Summary Report for Operable Unit 10-03 Ordnance* (DOE-ID 1998), NPG personnel used the site for disposal of land mine pressure plates and aerial bomb packaging materials and as an area to dispose of land mine fuzes by burning. More detailed information about the Land Mine Fuze Burn Area can be found in the Comprehensive RI/FS (DOE-ID 2001).

2.1.4 National Oceanic and Atmospheric Administration

The NOAA site is located just east of Lincoln Boulevard, approximately midway between Mile Markers 4 and 5 (see Figure 2-7). The contaminated area of the site is an estimated 18.7 ha (46 acres) (DOE-ID 2001). The site was used for a variety of explosive tests or cleanup detonations or both following such tests. The area contains a number of small craters, low-ordered bomb casings and detonators, and some widely scattered pieces of explosives. The NOAA site has been and is currently used by NOAA and other governmental agencies for a variety of atmospheric, geodetic, and weather-related monitoring and research work. More detailed information about the NOAA site can be found in the Comprehensive RI/FS (DOE-ID 2001).

2.1.5 Naval Ordnance Disposal Area

The NODA site is located approximately 1.6 km (1 mi) northeast of U.S. Highway 20/26 between Mile Markers 266 and 267 and about 3.2 km (2 mi) halfway from the Test Reactor Area, Idaho Nuclear Technology and Engineering Center, and CFA facilities at the INEEL, as shown in Figure 2-8. The Navy reportedly used the NODA as an ordnance and nonradioactive hazardous material disposal area during the 1940s. Following establishment of the National Reactor Testing Station (now the INEEL), the NODA came under control of the U.S. Atomic Energy Commission (now the U.S. Department of Energy). From about 1967 to 1985, approximately 3,175 kg (7,000 lb) of reactive materials was treated (burned) at the NODA. Between 1967 and 1985, the NODA also was used as a storage area for hazardous waste generated at the INEEL. Solvents, corrosives, ignitable materials, heavy metal-contaminated solutions, formaldehyde, polychlorinated biphenyl materials, waste laboratory chemicals, and reactive materials were stored at this site until 1982. By October 1985, all these materials had been removed for off-Site disposal as hazardous waste or treated on-Site by open burning, as allowed by Resource Conservation and Recovery Act (RCRA) regulations (DOE-ID 1998; 42 USC § 6901 et seq.).

In 1985, NODA was added to the RCRA, Part A, permit application as a thermal treatment unit. The last treatment of hazardous waste occurred in 1988 (except for one emergency action/detonation in 1990). In June 1990, a Memorandum of Understanding was developed between the Environmental Programs and Waste Reduction Operations Complex under which the Environmental Programs agreed to fund and manage all activities necessary to formally close the NODA, including soil sampling and analysis, removal of contaminated soil, emergency removal of ordnance, maintenance of access signs and barricades, and preparation and submittal of all required documentation. In 1997, the Interim Status of the NODA was terminated by the Idaho Department of Environmental Quality with the agreement that the CERCLA Program would perform the final evaluation of the site in accordance with the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991).

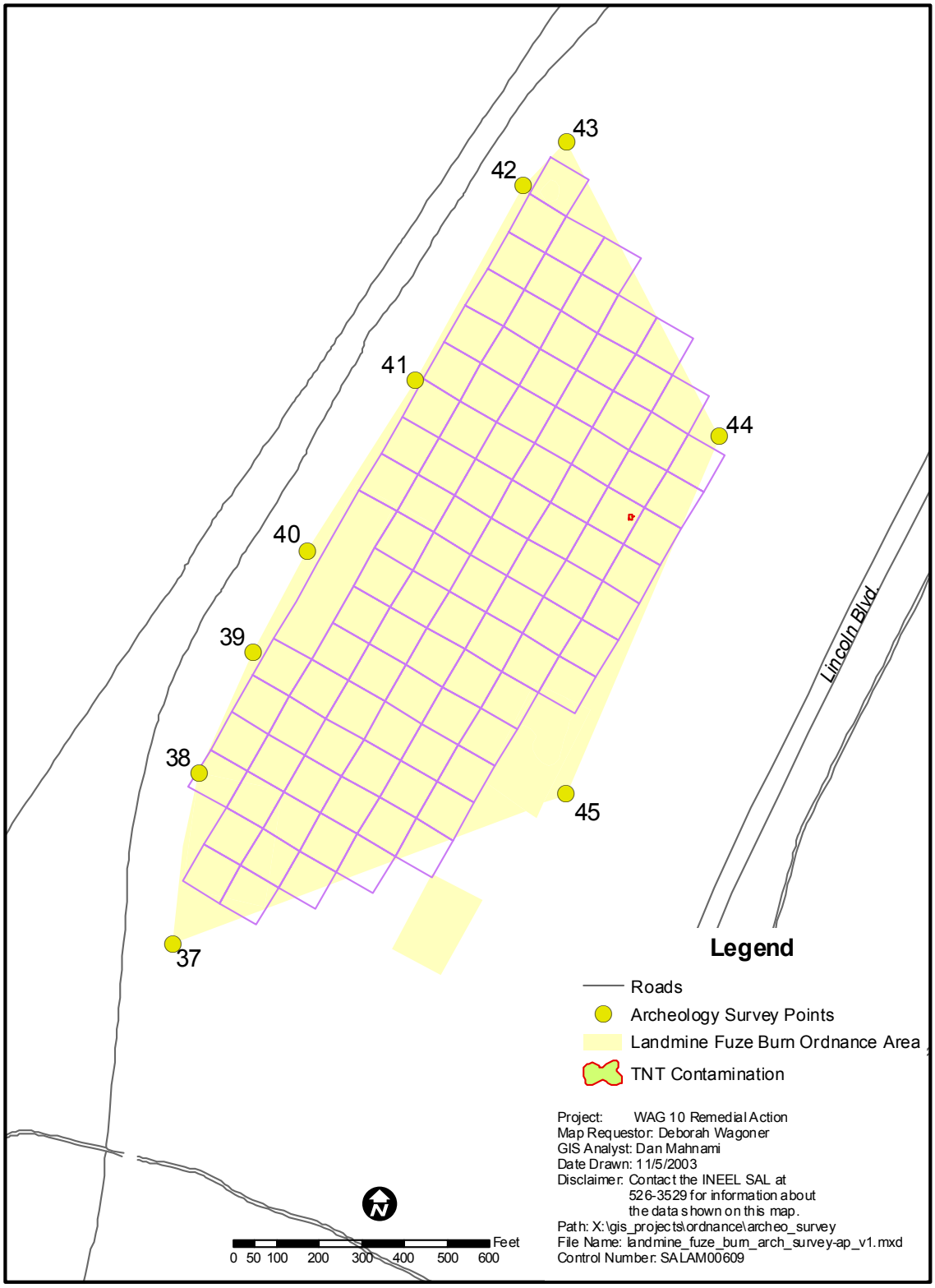


Figure 2-6. Location of the Land Mine Fuze Burn Area.

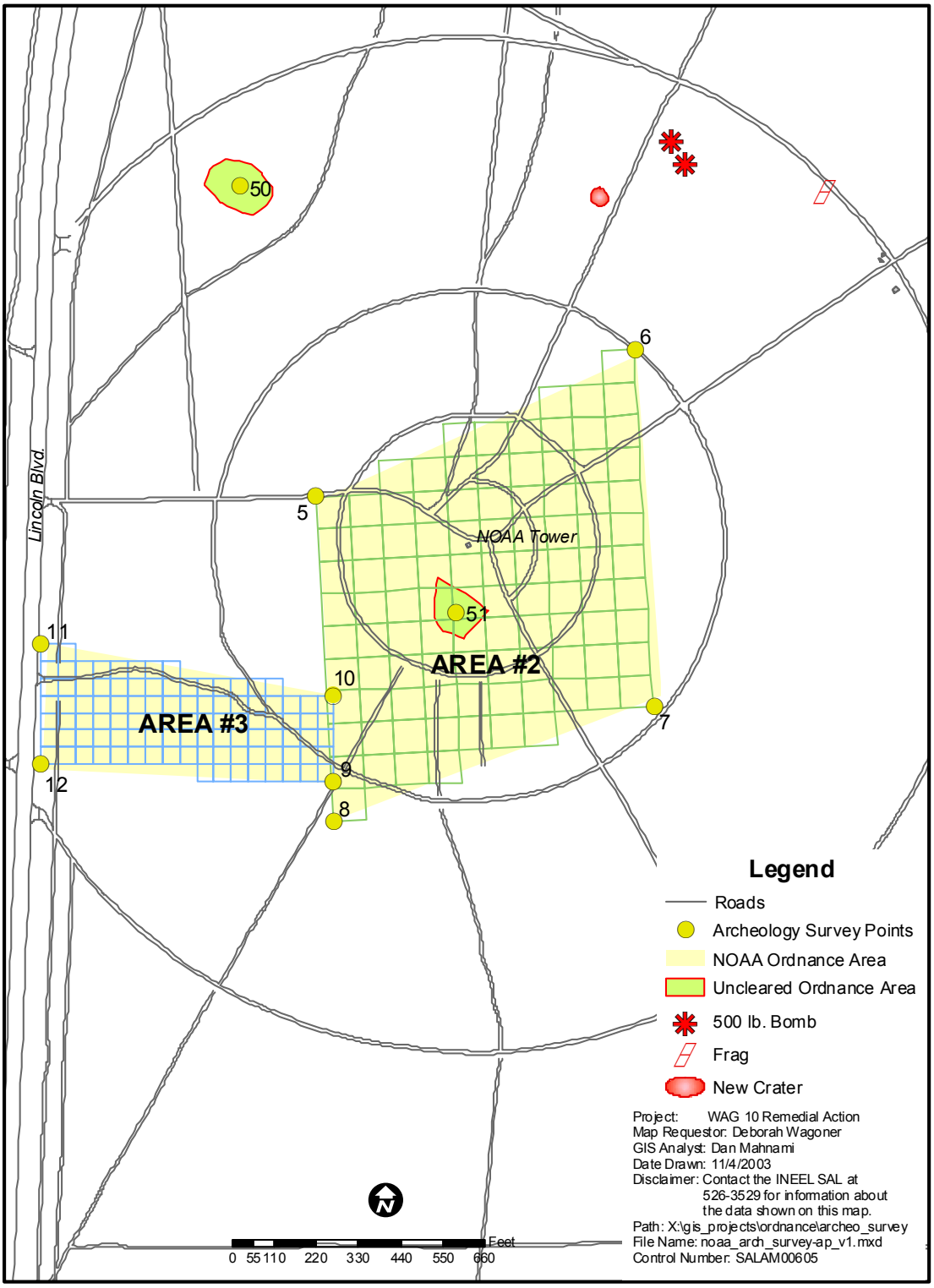


Figure 2-7. Location of the National Oceanic and Atmospheric Administration grid.

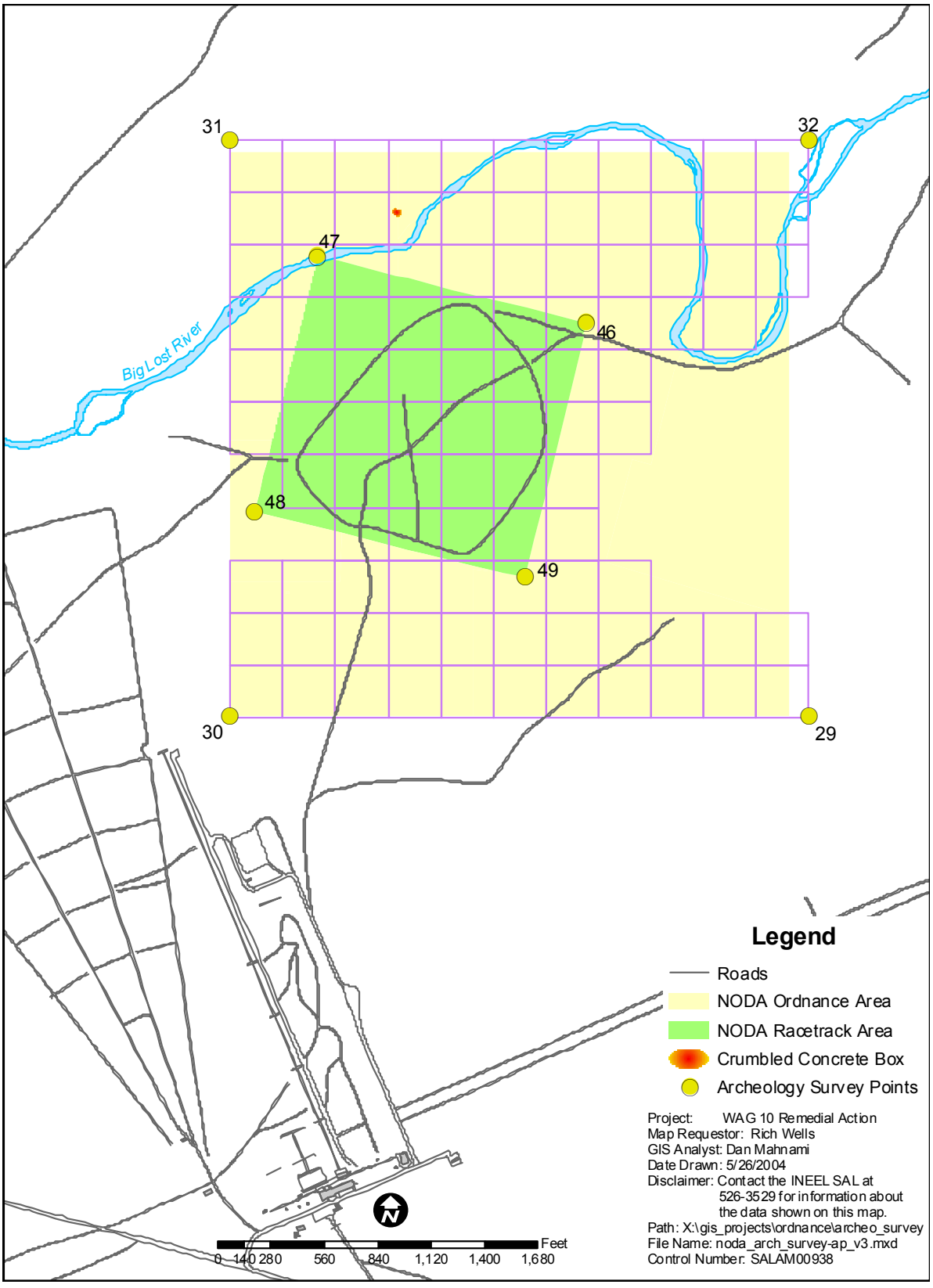


Figure 2-8. Location of the Naval Ordnance Disposal Area.

The 1994 removal action defined the cleanup area as 16 ha (40 acres) centered approximately 762 m (2,500 ft) north of the current INEEL security force gun range on Portland Avenue (DOE-ID 2001). Based upon visual observation, the contaminated area of the NODA Area 2 site is restricted to a few square meters within a single crater. More detailed information about the NODA site can be found in the Comprehensive RI/FS (DOE-ID 2001).

2.2 Nature and Extent of Contamination

Remedial action is required for the Fire Station II Zone and Range Fire Burn Area, Experimental Field Station, Land Mine Fuze Burn Area, NOAA, and NODA. The following subsections provide a brief description of the nature and extent of contamination at the five sites that require remediation. Detailed information about the individual sites can be found in the Comprehensive RI/FS (DOE-ID 2001).

2.2.1 Fire Station II Zone and Range Fire Burn Area

During a 1993 interim action, a 4-ha (10-acre) area of the Fire Station II Zone and Range Fire Burn Area (see Figure 2-4) was cleared to a depth of 0.61 m (2 ft) of UXO and pieces of explosives with only a few areas of explosive-contaminated soil found. Twenty samples were collected from the area and analyzed for TNT and RDX with results ranging from 0.0 to 2,141 parts per million (ppm) and 0.0 to 4.7 ppm, respectively. Areas above the TNT action levels were excavated by hand until the verification sample results met the cleanup level of 44 ppm and 18 ppm for RDX. These action levels were developed based upon a risk analysis performed in support of the development of the *Declaration of the Record of Decision for the Ordnance Interim Action, Operable Unit 10-05, Waste Area Group 10* (DOE-ID 1992). During the interim action, approximately 0.76 m^3 (1 yd^3) of contaminated soil was removed; therefore, no backfilling of the area was required.

During a 1996 field assessment, the entire site was assessed, including the area outside the 4-ha (10-acre) site that was cleared of ordnance during the 1993 interim action. The assessment included a visual examination for signs of craters, detonation tests, surface UXO, pieces of explosives, and soil contamination. The boundary of soil contamination was extended and mapped. The burn area was covered during the sweep of the downrange area. The area outside of the 4-ha (10-acre) site was walked at 10-m (33-ft) intervals. The area searched extended out to the last identified piece of TNT, which became the tentative outer boundary of the site. From this piece, the search moved laterally until another piece of TNT could be located. The search then again extended out to confirm that no other pieces could be found and then retracted to the last peripheral piece, which was flagged as the boundary. This search process was repeated until the entire boundary was established. In addition to the Fire Station II Area, the Range Fire Burn Area was assessed. The search team fanned out in approximately 10-m (33-ft) intervals from the Fire Station II training area and walked east and northeast toward the Experimental Field Station (DOE-ID 1998).

In 1999, surface soil samples were collected as described in the *Field Sampling Plan for Operable Unit 10-04 Explosive Compounds* (DOE-ID 1999). The results of this sampling effort were evaluated in the Comprehensive RI/FS (DOE-ID 2001). Contaminants were detected between 0 to 0.61 m (0 to 2 ft) below the ground surface; however, the highest detected concentrations were located mainly in the top 15 cm (0.5 ft) of the surface soil. The maximum detected RDX concentration was 3.7 mg/kg with the maximum TNT concentration being 130 mg/kg. Although some of the UXO was removed during the 1993 and 1997 removal activities, there is still some potential for UXO to remain in the area.

The human health risk assessment identified TNT as a contaminant of concern (COC) with a total risk for all pathways for the current occupational scenario being less than 1E-04, and the noncarcinogenic hazard index is less than 1.0. The total estimated risk for all pathways for the 100-year future residential

scenario is 1E-04 from TNT with a noncarcinogenic hazard index of 12. The total estimated risk for all pathways for the 100-year future occupational scenario is less than 1E-04 with a noncarcinogenic hazard index of less than 1.0. The ecological risk assessment identified both RDX and TNT as COCs for ecological receptors. The hazard quotients (HQs) for exposure to RDX in the surface and subsurface soil ranged from 2 for the mule deer to a maximum of 40 for the pygmy rabbit. The deer mouse also has HQs exceeding 1.0. The HQs for exposure to TNT in the surface and subsurface soil range from 9 for the deer mouse to a maximum of 20 for the pygmy rabbit. The State of Idaho classified the pygmy rabbit as a species of special concern.

2.2.2 Experimental Field Station

The 1996 field team encountered remnants of World War I and World War II vintage bombs and two areas of widespread heavy concentrations of explosive-contaminated soil near the Experimental Field Station (see Figure 2-5). One area was approximately 0.02 ha (0.05 acres) in size with the second area being approximately 2.0 ha (4.9 acres). The assessment included a visual examination for signs of craters, detonation test, surface UXO, pieces of explosives, and soil contamination. The area was searched for UXO using 10-m (33-ft) sweeps. When the team encountered areas of TNT contamination, the region was examined in greater detail and the area mapped. Several large craters were located in this area; however, no ordnance was found in any of the craters. The craters appear to have resulted from ordnance destruction or testing. Approximately 2.4 km (1.5 mi) away, the nose section of a World War I vintage bomb with TNT and an empty tail section of a World War I vintage bomb were found during the assessment and transported to the Mass Detonation Area (MDA) for disposal by detonation.

In 1999, surface soil samples were collected as described in the *Field Sampling Plan for Operable Unit 10-04 Explosive Compounds* (DOE-ID 1999). Nineteen samples were collected and analyzed with the results of the sampling effort evaluated in the Comprehensive RI/FS (DOE-ID 2001). Contaminants were detected between 0 to 0.61 m (0 to 2 ft) below the ground surface; however, the highest detected concentrations were mainly located in the top 15 cm (0.5 ft) of the surface soil. The maximum detected 1,3-dinitrobenzene concentration was 14 mg/kg with a maximum TNT concentration of 1,100 mg/kg. There is still some potential for UXO to remain at this site.

The human health risk assessment identified TNT as a COC based on human health risk estimates. The exposure pathway of concern is ingestion of homegrown produce. The total risk for all pathways for the current occupational scenario is less than 1E-04 with a noncarcinogenic hazard index equal to 1.0. The total estimated risk for all pathways for the 100-year future residential scenario is slightly less than 1E-04 with a noncarcinogenic hazard index of 10 primarily from TNT. The total estimated risk for all pathways for the 100-year occupational scenario is less than 1E-04 with a noncarcinogenic hazard index equal to 1.0. Both 1,3-dinitrobenzene and TNT were identified as COCs for ecological receptors. The HQs for exposure to 1,3-dinitrobenzene in the surface and subsurface soil ranged from 30 for the deer mouse to a maximum of 80 for the pygmy rabbit. The HQs for exposure to TNT in the surface and subsurface soil range from 200 for the deer mouse to a maximum of 300 for the pygmy rabbit. The State of Idaho classified the pygmy rabbit as a species of special concern.

2.2.3 Land Mine Fuze Burn Area

During the 1996 field assessment, the perimeter of the Land Mine Fuze Burn Area was established, and the area for the 1996 removal action was defined (see Figure 2-6). The subsurface was characterized using geophysical methods during a Technology Demonstration Project in June 1996. Approximately 0.6 ha (1.5 acres) was surveyed to a depth of 0.61 m (2 ft), and the area was mapped.

During the 1996 removal action, 8.1 ha (20 acres) was surface cleared of land mine fuzes and mine pressure plates, characterized using geophysical methods, and mapped. A subsurface clearance was not performed based on the removal action subcontractor's evaluation of the data; however, during the INEEL quality check of the results of the action on the site's subsurface, several inert items were found and excavated (DOE-ID 1998). Although some UXO was removed during the removal action, there is still potential for UXO to remain in the area.

In 1999, surface samples were collected as described in the *Field Sampling Plan for Operable Unit 10-04 Explosive Compounds* (DOE-ID 1999). The results of this sampling effort were evaluated in the Comprehensive RI/FS (DOE-ID 2001). Contaminants were detected between 0 to 0.61 m (0 to 2 ft) below the ground surface; however, the highest detected concentrations were located mainly in the top 15 cm (0.5 ft) of the surface soil. The maximum detected TNT concentration was 79,000 mg/kg.

The human health risk assessment identified TNT as a COC based on the human health risk estimates. The exposure pathways of concern are ingestion of soil, groundwater, and homegrown produce. The total risk for all pathways for the current occupational scenario is 4E-03 with a noncarcinogenic hazard index of 70. The total estimated risk for all pathways for the 100-year future residential scenario is 6E-03 with a noncarcinogenic hazard index of 700. The total estimated risk for all pathways for the 100-year future occupational scenario is 4E-03 with a noncarcinogenic hazard index of 70. The ecological risk assessment identified TNT as a COC in Area 3 for ecological receptors. The HQs for exposure to TNT in the surface and subsurface soil range from 900 for the deer mouse to a maximum of 10,000 for the pygmy rabbit. The State of Idaho classified the pygmy rabbit as a species of special concern.

2.2.4 National Oceanic and Atmospheric Administration

The location of the NOAA area is shown in Figure 2-7. During the 1993 interim action, a surface clearance and a geophysical survey were performed to a depth of 0.61 m (2 ft) on a large site consisting of 1.7 ha (4.13 acres) and a small site consisting of 0.88 ha (2.17 acres). No UXO was found below the surface, but pieces of TNT remained at the surface following the action. The materials removed during the 1993 action included a 250-lb bomb casing, two 3-in. projectile flare candles, one electric squib, and pieces of TNT found on the surface. No actual excavation took place or any subsequent backfilling of the area.

During the 1996 field assessment, the major objectives of the field team were to determine whether ordnance or soil contamination existed outside the previously identified area, to establish the boundary, to re-estimate the volume of contaminated soil, and to look for any indications that detonation pits existed in the area. Field crews searched the area on foot at approximately 10-m (33-ft) intervals and located scattered TNT ranging in size from small flakes to baseball-size chunks. The area of contamination covers a large area of the site. Several craters that appeared to be sites of ordnance destruction were located on the south side of the site. Several partial 100-lb bombs were found southeast of the site, which indicates they had been intentionally *low-ordered*. A low-order detonation is the result of a low-order procedure intended to detonate an explosive item without causing the item to totally consume itself. A low-order procedure is performed in an area that could not withstand a high-order detonation, which would have totally consumed the item.

In 1999, surface soil samples were collected as described in the *Field Sampling Plan for Operable Unit 10-04 Explosive Compounds* (DOE-ID 1999). The results of this sampling effort were evaluated in the Comprehensive RI/FS (DOE-ID 2001). Contaminants were detected between 0 to 0.61 m (0 to 2 ft) below the ground surface; however, the highest detected concentrations were mainly located in the top 15 cm (0.5 ft) of the surface soil. The maximum detected 1,3-dinitrobenzene concentration was 27 mg/kg,

with maximum detected concentrations for RDX and TNT of 53 mg/kg and 17,014 mg/kg, respectively. During the 1993 and 1997 removal activities, UXO was removed; however, there is still potential for some UXO to remain in the area.

The human health risk assessment identified TNT as a COC for all study areas based on human health risk estimates. The exposure pathways of concern are ingestion of soil, groundwater, and homegrown produce. The total risk for all pathways for the current occupational scenario is less than 1E-04 with a noncarcinogenic hazard index less than 1.0. The total estimated risk for all pathways for the 100-year future residential scenario is 4E-04 with a noncarcinogenic hazard index of 40. The total estimated risk for all pathways for the 100-year future occupational scenario is less than 1E-04 with a noncarcinogenic hazard index less than 1.0. The ecological risk assessment identified 1,3-dinitrobenzene (Study Area 6), RDX (Study Area 3), and TNT (Study Areas 2a, 3, 5, and 6) as COCs for ecological receptors. The HQs for exposure to 1,3-dinitrobenzene in the surface and subsurface soil ranged from 1 for the mule deer to a maximum of 200 for the pygmy rabbit. The deer mouse also has HQs exceeding 1.0. The HQs for exposure to RDX in the surface and subsurface soil ranged from 1 for the mule deer to a maximum of 20 for the pygmy rabbit with the deer mouse also having HQs exceeding 1.0. The HQs for exposure to TNT in the surface and subsurface soil ranged from 4 for the mule deer to a maximum of 500 for the pygmy rabbit with the deer mouse also having HQs exceeding 1.0. The State of Idaho classified the pygmy rabbit as a species of special concern.

2.2.5 Naval Ordnance Disposal Area

The location of the NODA is shown in Figure 2-8. During the 1994 removal action, 11.7 ha (28.92 acres) was cleared of ordnance and pieces of explosives to a depth of 1.2 m (4 ft). An additional 1.6 ha (3.89 acres) was cleared to a depth of 1.2 m (4 ft) from Lincoln Boulevard to the NODA to accommodate an access road. Because of the lack of information pertaining to tests performed in the pits at the NODA site, none of the pits was addressed during this action. The removal action was continued during the summer of 1995 when an additional 9.1 ha (22.56 acres) was cleared to a depth of 0.61 m (2 ft). The depth was reduced to 0.61 m (2 ft) from 1.2 m (4 ft) based on the results of the 1994 removal action. At this time, five pits were remediated. Two pits were remediated with a remote excavator, two pits were remediated with a backhoe, and one pit was hand excavated. The pits were excavated until the geophysical search revealed that no additional anomalies were identified (DOE-ID 1998). No backfilling of the pits was performed at this time. The removal actions covered separate areas with the exception that the pits previously encountered during the 1994 removal action were remediated during the 1995 activities.

During the 1996 field assessment, it was noted that the area outside the site was cleared during the 1994 and 1995 removal actions and was searched by field crews on foot using approximately 10-m (33-ft) intervals beginning at the west boundary. This search was continued outward until the last piece of fragmentation was found. All four sides of the original removal action site were assessed with multiple types of UXO recovered. Seven live 12.7-cm (5-in.) projectiles and one split-open 12.7-cm (5-in.) projectile with a live fuze were found. Scattered TNT and RDX were found on the south side and southeast corner of the area. What appears to have been a munitions burn facility (crumbled concrete box) was found just west of the Big Lost River. No ordnance or ordnance waste was found at this site; however, what appears to have been fuel-stained soil was observed on the berm on which this facility was constructed (DOE-ID 1998). Although UXO has been previously detected and cleared from this site, clearance cannot be considered complete for unrestricted land use.

In 1999, surface soil samples were collected as described in the *Field Sampling Plan for Operable Unit 10-04 Explosive Compounds* (DOE-ID 1999). The results of this sampling effort were evaluated in the Comprehensive RI/FS (DOE-ID 2001). Contaminants were detected between 0 to 0.61 m (0 to 2 ft)

below the ground surface; however, the highest detected concentrations were mainly located in the top 15 cm (0.5 ft) of the surface soil. The maximum detected RDX concentration was 328 mg/kg. Based on the sampling results, only 2 acres of the 138-acre site pose a risk to human health and ecological receptors with actual contamination restricted to a single crater. The UXO removal activities were conducted in 1994, 1995, and 1997 at the site; however, there is still some potential for UXO remaining in the area.

The human health risk assessment identified RDX as a COC for Area 2 based on human health risk estimates. The exposure pathways of concern are ingestion of groundwater and homegrown produce. The total risk for all pathways for the current occupational scenario is less than 1E-04 with a noncarcinogenic hazard index less than 1.0. The total estimated risk for all pathways for the 100-year future residential scenario is 1E-02 with a noncarcinogenic hazard index of 100. The total estimated risk for all pathways for the 100-year future occupational scenario is less than 1E-04 with a noncarcinogenic hazard index less than 1.0. The ecological risk assessment identified RDX as a COC for Area 2 ecological receptors. The HQs for exposure to RDX in the surface and subsurface soil ranged from 3 for the Townsend's western big-eared bat to a maximum of 4,000 for the pygmy rabbit. The mule deer and the deer mouse also have HQs exceeding 1.0. The State of Idaho classified the pygmy rabbit as a species of special concern.

2.3 Project Description

Based on consideration of the CERCLA requirements, the detailed analysis of alternatives, and public comments, the Agencies have chosen removal, treatment, disposal of soil on the INEEL, and institutional controls as the remedy for the TNT/RDX contaminated soil sites at OU 10-04. Performance standards were implemented as design criteria for each site to ensure that the selected remedy protects human health and the environment. Five-year reviews will be used to ensure that the selected remedy remains protective and appropriate.

2.3.1 Contaminated Soil Sites

The selected remedy for the OU 10-04 TNT/RDX contaminated soil sites is removal and treatment of TNT/RDX fragments, removal and disposal of soil on the INEEL, and institutional controls. Soil exceeding 10% TNT/RDX concentrations will be removed and sent off-Site for treatment and disposal. This remedy was selected based on the results of the comparative analysis of alternatives with the selected remedy being protective of human health and the environment and in compliance with laws. The long-term effectiveness is high, because TNT/RDX contamination will be removed. Reduction of toxicity, mobility, and volume is moderate; although TNT and RDX fragments would be removed before detonation, the rest of the contaminated soil would be removed and disposed of but not treated. However, the contaminants would be contained, protecting humans and ecological receptors from exposure. Short-term effectiveness would be moderate because of the possibility for worker exposure during excavation, treatment, transport, and disposal activities. The ability to implement the remedial action is high, because equipment, technologies, and personnel are all available.

Remediation of the TNT/RDX contaminated soil sites will include the following activities:

- Establish and maintain institutional controls such as access controls and land-use restrictions and other restrictions such as signs and fences until the TNT/RDX contamination is removed or reduced to acceptable levels. The specific goals of the institutional controls are to control human activity at sites with TNT/RDX contamination and prevent harm from direct exposure to toxic chemicals. Institutional controls will restrict access, and monitoring will be performed since buried, undetected TNT and RDX fragments could exist after remediation.

- Perform a visual survey for UXO and TNT/RDX fragments and stained soil and a geophysical survey for UXO.

- Excavate soil contaminated with concentrations in excess of the remediation goals by hand unless it is determined that mechanical excavation equipment can be used. The UXO will be removed, if required, to proceed with soil excavation. Otherwise, UXO removal will be performed during remediation of the ordnance areas.

- Manually segregate fragments of TNT/RDX from the soil unless the safety assessment indicates it is safe to mechanically screen the soil.

- Dispose of the TNT/RDX fragments by detonation at the MDA. If recovery and transport of TNT/RDX fragments pose an unacceptable risk to the worker, the fragments may be detonated in place. Waste generated during detonation activities will be addressed using current disposal practices.

- Use field screening methods and soil sampling with laboratory analysis to determine the extent of soil removal required to meet remediation goals.

- Sample and analyze removed soil to determine the TNT and RDX concentrations and whether the soil exhibits any RCRA hazardous waste characteristics. If the soil is less than 10% TNT and RDX and not RCRA regulated, it will be disposed of at an approved landfill on or off the INEEL. If the TNT and RDX concentration is above 10% and considered RCRA regulated, the soil will be transported to a permitted RCRA treatment and disposal facility for thermal treatment and disposal.

- Backfill areas excavated to depths greater than 0.3 m (1 ft) with uncontaminated soil or contour to match the surrounding terrain and vegetate.

- Monitor air and soil until the TNT/RDX contamination and UXO contamination are removed or reduced to allow unrestricted use.

The UXO surveys and removal, if required, will be performed using standard military techniques. Soil will be characterized and excavated either manually or mechanically, as permitted by safety analysis. The TNT and RDX fragments will be segregated from the soil and detonated at the MDA. Sampling will be performed to determine if products of incomplete combustion are present after detonation events at the MDA. Although detectable levels are not expected, remediation of soil contamination at the MDA will be performed after remediation if residual risk exceeds 1E-04. Therefore, the MDA will be investigated for remediation after remediation of the ordnance areas and the TNT/RDX sites is complete.

Following separation of the TNT and RDX fragments, the contaminated soil will be disposed of at an approved facility on or off the INEEL. Verification sampling will be performed to confirm that soil above the remediation goals has been removed. The sites will be restored in accordance with the INEEL revegetation procedures.

Institutional controls will be maintained at these sites until the TNT/RDX contamination is removed or reduced to acceptable levels. Controls are required to restrain human activity at areas with TNT/RDX contamination and prevent harm from direct exposure to toxic and hazardous secondary explosive material. In April 1999, the EPA Region 10 developed a policy for institutional controls. During this OU 10-04 remedial design/remedial action phase for the TNT/RDX contaminated soil sites, the *Operations and Maintenance Plan for Operable Units 6-05 and 10-04, Phase II* (DOE-ID 2004c) has been developed that contains the institutional controls for the TNT/RDX sites following the guidelines in the policy. This Operations and Maintenance Plan establishes uniform

requirements of the institutional control remedy components for all TNT/RDX sites and specifies the monitoring and maintenance requirements.

Institutional controls will reside with the U.S. Department of Energy or another government agency until 2095, based on the *INEEL Comprehensive Facility and Land Use Plan* (DOE-ID 2004d), or until a remedy review or INEEL-wide, 5-year statutory review concludes that unrestricted land use is allowable.

3. SAMPLING DATA QUALITY OBJECTIVES

Data needs and data quality objectives (DQOs) for conducting the proposed sampling in support of the remedial action activities for the individual sites are defined in the following sections. Data needs have been determined through the evaluation of existing data and the projection of data requirements anticipated for the analysis of samples collected during the Phase II remedial action. The DQOs have been developed following the process outlined in *Guidance for the Data Quality Objectives Process* (EPA 1994).

3.1 Problem Statement

The first step in the DQO process is to state the problem to be addressed and to put it in programmatic context. There are three basic parts of the problem: (1) soil excavation, (2) waste designation, and (3) confirmation that the remedial action objectives have been achieved. Soil excavation addresses the field input to guide excavation locations and minimize soil removal. Waste designation addresses whether the excavated soil may be characteristic. Soil from specific areas identified in the following problem statements may exceed the toxicity characteristic leaching procedure (TCLP) concentration for a given analyte. For the Land Mine Fuze Burn Area, the total 2,4-dinitrotoluene maximum concentration is 23.6 mg/kg, which when converted to its TCLP concentration using the 20X rule of dilution results in 1.18 mg/L as compared to a TCLP regulatory concentration of 0.13 mg/L. Similarly for NODA, the total lead maximum concentration is 1,790 mg/kg, which, when converted to its TCLP concentration using the 20X rule of dilution, results in 89.5 mg/L as compared to a TCLP regulatory concentration of 5.0 mg/L. Confirmation addresses soil remaining in place.

The problem statements associated with the DQO process are as follows:

- **Problem Statement 1a**—Given that the contaminated soil from the Fire Station II Zone and Range Fire Burn Area needs to be excavated and disposed of, collect near-real-time data for TNT and RDX to guide excavation locations and minimize soil disposal

- **Problem Statement 1b**—Given that the contaminated soil from the Experimental Field Station needs to be excavated and disposed of, collect near-real-time data for TNT to guide excavation locations and minimize soil disposal

- **Problem Statement 1c**—Given that the contaminated soil from the Land Mine Fuze Burn Area needs to be excavated and disposed of, collect near-real-time data for TNT to guide excavation locations and minimize soil disposal

- **Problem Statement 1d**—Given that the contaminated soil from the NOAA needs to be excavated and disposed of, collect near-real-time data for TNT and RDX to guide excavation locations and minimize soil disposal

- **Problem Statement 1e**—Given that the contaminated soil from the NODA needs to be excavated and disposed of, collect near-real-time data for RDX to guide excavation locations and minimize soil disposal

- **Problem Statement 2a**—Given that the TCLP concentration for 2,4-dinitrotoluene at the Land Mine Fuze Burn Area potentially exceeds the regulatory level, collect characterization data required to determine whether excavated soil requires stabilization prior to disposal

- **Problem Statement 2b**—Given that the TCLP concentration for lead at the NODA potentially exceeds the regulatory level, collect characterization data required to determine whether excavated soil requires stabilization prior to disposal

- **Problem Statement 3a**—Given that soil remains in place at the Fire Station II Zone and Range Fire Burn Area, collect the confirmation data required to demonstrate that the remedial action objectives specified in the ROD (DOE-ID 2002) for TNT and RDX have been achieved

- **Problem Statement 3b**—Given that soil remains in place at the Experimental Field Station, collect the confirmation data required to demonstrate that the remedial action objectives specified in the ROD (DOE-ID 2002) for TNT and 1,3-dinitrobenzene have been achieved

- **Problem Statement 3c**—Given that soil remains in place at the Land Mine Fuze Burn Area, collect the confirmation data required to demonstrate that the remedial action objectives specified in the ROD (DOE-ID 2002) for TNT have been achieved

- **Problem Statement 3d**—Given that soil remains in place at the NOAA, collect the confirmation data required to demonstrate that the remedial action objectives specified in the ROD (DOE-ID 2002) for TNT, RDX, and 1,3-dinitrobenzene have been achieved

- **Problem Statement 3e**—Given that soil remains in place at the Experimental Field Station, collect the confirmation data required to demonstrate that the remedial action objectives specified in the ROD (DOE-ID 2002) for RDX have been achieved.

3.2 Decision Identification

The purpose of DQO Step 2 is to define the principal study questions (PSQs) that need to be resolved to address the problem statements identified in DQO Step 1 and the alternative actions that would result from resolution of the PSQs. The PSQs and the associated alternative actions were combined into decision statements (DSs). The PSQs and resultant DSs are as follows:

- **PSQ #1a through #1e**—How far and where should the excavation be carried out?

- **DS #1a through #1e**—Determine the extent of initial excavation and subsequent hot spot excavations.

- **PSQ #2a**—Is excavated soil from the Land Mine Fuze Burn Area characteristic for 2,4-dinitrotoluene?

- **DS #2a**—Determine the TCLP concentrations for 2,4-dinitrotoluene.

- **PSQ #2b**—Is excavated soil from the NODA characteristic for lead?

- **DS #2b**—Determine the TCLP concentrations for lead.

- **PSQ #3a through 3e**—Does soil remaining after remediation meet site remedial action goals?

- **DS #3a through 3e**—Determine whether soil remaining after remediation meets site remedial action goals as specified in the ROD (DOE-ID 2002), and determine whether remediation is complete, as defined in Section 3.7.2.

3.3 Decision Inputs

The purpose of DQO Step 3 is to identify the type of data needed to resolve each of the DSs identified in DQO Step 2. These data may already exist or may be derived from computational or surveying/sampling and analysis methods. Analytical performance requirements (e.g., practical quantitation limit [PQL] requirement, precision, and accuracy) also are provided in this step for any new data that need to be collected.

3.3.1 Information Required to Resolve Decision Statements

It is necessary to determine the information (data) required to resolve each of the DSs identified in Section 3.2 and identify whether these data already exist. For the Fire Station II Zone and Range Fire Burn Area, data for concentrations of TNT and RDX are needed to address DSs 1a and 3a. For the Experimental Field Station, data for concentrations of TNT and 1,3-dinitrobenzene are needed to address DSs 1b and 3b. For the Land Mine Fuze Burn Area, data for concentrations of TNT are needed to address DSs 1c and 3c. For DS #2a, TCLP concentrations for 2,4-dinitrotoluene are needed to determine whether soil excavated from the Land Mine Fuze Burn Area is characteristic, thus requiring stabilization prior to disposal. For the NOAA, data for concentrations of TNT, RDX, and 1,3-dinitrobenzene are needed to address DSs 1d and 3d. For the NODA, data for concentrations of RDX are needed to address DSs 1e and 3e. For DS #2b, TCLP concentrations for lead are needed to determine whether the soil excavated from the NODA is characteristic, thus requiring stabilization prior to disposal The data acquired to satisfy DSs 1a through 1e will consist of field screening measurements of COCs. The data acquired to satisfy DSs 3a through 3e will consist of both field screening and laboratory measurements of COCs. Data for DSs 1a through 1e are required to estimate the depth distribution of contaminants to aid in the removal action, and data for DSs 3a through 3e are required of the remaining soil to demonstrate that the remedial action objectives have been achieved.

3.3.2 Basis for Setting the Action Level

The action level is the threshold value that provides the criterion for choosing between alternative actions. The basis for setting the action level for DSs 1a through 1e and 3a through 3e is the potential for exceeding human health and/or ecological risk-based concentrations in the contaminated soil. For DSs 2a and 2b, the action level is the toxicity characteristic regulatory concentration as defined in 40 CFR 261.24, “Toxicity Characteristic.” The numerical values of the action levels are defined in DQO Step 5.

3.3.3 Computational and Survey/Analytical Methods

Table 3-1 identifies the DSs where existing data either do not exist or are of insufficient quality to resolve the DSs. In addition, Table 3-1 presents computational and surveying/sampling methods that could be used to obtain the required data. Field screening samples will be collected for the contaminants to estimate the areal and depth distribution of the COCs exceeding the remedial action goals during the remedial action to support DSs 1a through 1e. However, a statistically based number of samples will be collected for DSs 3a through 3e where the 95% upper confidence limit (UCL) of the mean will be compared to the remedial action goals, as defined in the ROD (DOE-ID 2002). For DSs 2a and 2b, samples will be collected for TCLP analysis from the excavated soil to determine whether they are characteristic for the given contaminants.

Table 3-1. Information required to resolve the decision statements.

DS #	Required Data	Computational Methods	Survey/Analytical Methods for Determination of Contaminant Concentrations in Soil
1a through 1e	Chemical concentrations and extent of contamination	Field screening measurements	Field test kits
2a and 2b	Toxicity characteristic leaching procedure concentrations in soil	Compare results to contaminant concentrations for the toxicity characteristic	Laboratory analysis
3a, 3c, and 3e	Chemical concentrations in soil	Compare mean (95% upper confidence limit) to remedial action goals	Field test kits with 20% submitted for analytical laboratory determination of contaminant concentrations in soil
3b and 3d	Chemical concentrations in soil	Compare mean (95% upper confidence limit) to remedial action goals	Laboratory analysis

DS = decision statement

3.3.4 Analytical Performance Requirements

Table 3-2 defines the analytical performance requirements for the data that need to be collected to resolve each DS. These performance requirements include the PQL and precision and accuracy requirements for each COC.

3.4 Study Boundaries

The primary objective of DQO Step 4 is to identify the population of interest, define the spatial and temporal boundaries that apply to each DS, and identify any practical constraints (hindrances or obstacles) that must be taken into consideration in the sampling design. Implementing this step ensures that the sampling design will result in the collection of data that accurately reflect the true condition of the site under investigation.

3.4.1 Population of Interest

Before defining the spatial and temporal boundaries of the site under investigation, it is first necessary to clearly define the populations of interest that apply for each DS. The populations of interest are as follows:

- **DSs #1a through 1e**—Contaminated and potentially contaminated soil during excavation
- **DSs 2a and 2b**—Contaminated excavated soil
- **DSs #3a through 3e**—Remaining soil.

Table 3-2. Analytical performance requirements.

DS #	Target Analyte List	Survey/Analytical Methods	Preliminary Action Level	PQL	Precision Requirement	Accuracy Requirement
1a through 1d	TNT	SW-846 Method 8515	16 mg/kg	0.7 mg/kg	± 15%	85–115
1a, 1d, and 1e	RDX	SW-846 Method 8510	4.4 mg/kg	0.8 mg/kg	± 15%	85–115
2a	2,4-DNT	SW-846 Method 1311/8270	0.13 mg/L	0.05 mg/L	± 15%	85–115
2b	Lead	SW-846 Method 1311/6010	5.0 mg/L	0.075 mg/L	± 15%	85–115
3a	TNT RDX	SW-846 Method 8515 SW-846 Method 8510 SW-846 Method 8330	16 mg/kg 4.4 mg/kg	0.7 mg/kg[a] 0.8 mg/kg[b] 0.25 mg/kg[c] 1 mg/kg[c]	± 15%	85–115
3b	TNT 1,3-DNB	SW-846 Method 8330	16 mg/kg 6.1 mg/kg	0.25 mg/kg 0.25 mg/kg	± 15%	85–115
3c	TNT	SW-846 Method 8330 SW-846 Method 8515	16 mg/kg	0.25 mg/kg 0.7 mg/kg[a]	± 15%	85–115
3d	TNT RDX 1,3-DNB	SW-846 Method 8330	16 mg/kg 4.4 mg/kg 6.1 mg/kg	0.25 mg/kg 1 mg/kg 0.25 mg/kg	± 15%	85–115
3e	RDX	SW-846 Method 8330 SW-846 Method 8510	4.4 mg/kg	1 mg/kg 0.8 mg/kg[b]	± 15%	85–115

Note: For more detail regarding SW-846, see EPA (2002).
a. The PQL for analysis of TNT by Method 8515
b. The PQL for analysis of RDX by Method 8510
c. The PQL for analysis of TNT and RDX by Method 8330
2,4-DNT = 2,4-dinitrotoluene
1,3-DNB = 1,3-dinitrobenzene
DS = decision statement
PQL = practical quantitation limit
RDX = Royal Demolition Explosive
TNT = trinitrotoluene

3.4.2 Geographic Boundaries

The geographic boundaries for DSs 1a through 1e include the lateral boundary of the contaminated zones, approximately 7.6 cm (3 in.) deep across the areas with additional volume coming from the removal of hot spots. For DSs 2a and 2b, the geographic boundary will be the excavated soil stockpiled prior to disposal while awaiting analysis. The geographic boundary for DSs 3a through 3e will be the footprint of the excavation.

3.4.3 Temporal Boundaries

The temporal boundary refers to both the timeframe in which each DS applies and in which the data should be collected. The sample collection timeframe for DSs 1a through 1e is limited to the duration of the soil excavation. For DSs 2a and 2b, the sample collection timeframe will be following excavation

prior to soil treatment (if required) and disposal. The DSs 3a through 3e sampling will take place after excavations are complete and field measurements demonstrate that contaminant levels are below the remedial action goals.

3.4.4 Practical Constraints

Practical constraints that could affect the data collection effort include physical barriers and potential background interference during field and laboratory measurements.

3.5 Decision Rule

The purpose of DQO Step 5 is initially to define the statistical parameter of interest (i.e., mean or 95% UCL) that will be used for comparison against the action level. Table 3-3 summarizes the decision rules for the DSs provided in Section 3.2. These decision rules summarize the attributes the decision-maker needs to know about the sample population and how this knowledge will guide the selection of a course of action to solve the problem.

Table 3-3. Decision rules for the Operable Unit 10-04 Phase II areas.

DS#	DR#	Decision Rule
1a through 1e	1a through 1e	• **If** any COC concentration exceeds the remediation goals stated in the ROD (DOE-ID 2002), **then** the soil will be removed **or** the confirmation sampling will be carried out.
2a	2a	• **If** the 2,4-dinitrotoluene TCLP concentration exceeds the regulatory level for the toxicity characteristic, **then** the excavated soil will be stabilized prior to disposal **or** the excavated soil can be direct disposed.
2b	2b	• **If** the lead TCLP concentration exceeds the regulatory level for the toxicity characteristic, **then** the excavated soil will be stabilized prior to disposal **or** the excavated soil can be direct disposed.
3a through 3e	3a through 3e	• **If** the concentration representing the 95% upper confidence limit on the true population mean for each COC does not exceed the respective remedial action objective as stated in the ROD (DOE-ID 2002), **then** the site will be designated as remediated and closeout can proceed **or** the remediation goals have not been achieved and additional excavation is required.

COC = contaminant of concern
DR = decision rule
DS = decision statement
ROD = Record of Decision
TCLP = toxicity characteristic leaching procedure

3.6 Decision Error Limits

Since analytical data can only estimate the true condition of the site under investigation, decisions that are made based on measurement data could potentially be in error (i.e., decision error). The primary objective of DQO Step 6 is to determine which DSs, if any, require a statistically based sample design with tolerable limits on the probability of making a decision error (i.e., deciding that a site is clean when residual contamination in excess of the remedial action goal remains).

Taking into consideration the timeframe in which each of the DSs apply, the qualitative consequences of an inadequate sampling design, and the accessibility of the site if resampling is required, the soil affected by DSs 3a through 3e has been retained for a statistical sampling design.

For Decision Rules 1a through 1e and 3a through 3e, the two types of decision error that could occur are as follows: treating (managing and disposing of) clean site media as if it were contaminated and treating (managing and disposing of) contaminated site media as if it were clean. The decision error that has the more severe consequence is the latter, since the error could result in human health and/or ecological impacts. Given the two possible errors, null hypotheses were developed for each COC stating the opposite of what the investigation hopes to demonstrate. For the Fire Station II Zone and Range Fire Burn Area, the null hypotheses are stated as follows:

- The true mean concentration of TNT exceeds the remediation goal of 16 mg/kg, as stated in the ROD (DOE-ID 2002)

- The true mean concentration of RDX exceeds the remedial action goal of 4.4 mg/kg, as stated in the ROD (DOE-ID 2002).

For the Experimental Field Station, the null hypotheses are stated as follows:

- The true mean concentration of TNT exceeds the remediation goal of 16 mg/kg, as stated in the ROD (DOE-ID 2002)

- The true mean concentration of 1,3-dinitrobenzene exceeds the remedial action goal of 6.1 mg/kg.

For the Land Mine Fuze Burn Area, the null hypothesis is stated as follows:

- The true mean concentration of TNT exceeds the remediation goal of 16 mg/kg, as stated in the ROD (DOE-ID 2002).

For the NOAA, the null hypotheses are stated as follows:

- The true mean concentration of TNT exceeds the remediation goal of 16 mg/kg, as stated in the ROD (DOE-ID 2002)

- The true mean concentration of RDX exceeds the remedial action goal of 4.4 mg/kg, as stated in the ROD (DOE-ID 2002)

- The true mean concentration of 1,3-dinitrobenzene exceeds the remedial action goal of 6.1 mg/kg.

For the Experimental Field Station, the null hypothesis is stated as follows:

- The true mean concentration of RDX exceeds the remediation goal of 4.4 mg/kg, as stated in the ROD (DOE-ID 2002).

The statistical parameter of interest is the contaminant concentration representing the 95% UCL of the true population mean. The gray region will be taken to be from 80 to 100% of the prescribed remediation goals.

For Decision Rules 2a and 2b, the two types of decision error that could occur are as follows: treating (managing and disposing of) noncharacteristic excavated contaminated site media as if it were

characteristic and treating (managing and disposing of) characteristic excavated contaminated site media as if it were not characteristic. The decision error that has the more severe consequence is the latter, since the error could result in the direct disposal of soil that should be stabilized prior to disposal. Given the two possible errors, a null hypothesis was developed for the COCs stating the opposite of what the investigation hopes to demonstrate. The null hypotheses are stated as follows:

- The true TCLP concentration of 2,4-dinitrotoluene in soil excavated from the Land Mine Fuze Burn Area exceeds the toxicity characteristic level of 0.13 mg/L, as defined in 40 CFR 261.24

- The true TCLP concentration of lead in soil excavated from the NODA exceeds the toxicity characteristic level of 5.0 mg/L, as defined in 40 CFR 261.24.

3.7 Design Optimization

The objective of DQO Step 7 is to present alternative data collection designs that meet the minimum data quality requirements, as specified in DQO Steps 1–6. A selection process is then used to identify the most resource-effective data collection design that satisfies all of the data quality requirements.

The soil covered under DSs 1a through 1e and 2a and 2b will be sampled following a nonstatistical approach. The remaining soil addressed in DSs 3a through 3e will be sampled in accordance with a statistical design. The following subsections present the selected field screening and sampling methods for resolving each DS along with a summary of the proposed implementation design.

3.7.1 Soil Removal Survey

Field screening will be used to identify hot spots and make decisions in the field as to whether further excavation is warranted. Final status of the site will be based on confirmation sample data. For all areas, further excavation will be performed in hot spots identified on the basis of results from field screening samples until all contamination above the remedial action goals is removed, as demonstrated by the field screening measurements, or until the basalt interface is exposed or a depth of 3.0 m (10 ft) is reached, whichever is less.

The initial removal of soil at the Fire Station II Zone and Range Fire Burn Area will involve excavating the top surface soil from those areas visually identified as being contaminated with TNT and RDX. Screening samples will be collected from the newly exposed soil in the excavation areas to identify potential hot spots. All samples will be analyzed for TNT and RDX using field test kits.

The initial removal of soil at the Experimental Field Station will involve excavating the top surface soil from those areas visually identified as being contaminated with TNT and 1,3-dinitrobenzene. Screening samples will be collected from the newly exposed soil in the excavation areas to identify potential hot spots. All samples will be analyzed for TNT using field test kits with TNT being used as an indicator of the presence of 1,3-dinitrobenzene.

The initial removal of soil at the Land Mine Fuze Burn Area will involve excavating the top surface soil from those areas visually identified as being contaminated with TNT. Screening samples will be collected from the newly exposed soil in the excavation areas to identify potential hot spots. All samples will be analyzed for TNT using field test kits.

The initial removal of soil at the NOAA will involve excavating the top surface soil from those areas visually identified as being contaminated with TNT, RDX, and 1,3-dinitrobenzene. Screening

samples will be collected from the newly exposed soil in the excavation areas to identify potential hot spots. All samples will be analyzed for TNT and RDX using field test kits with TNT or RDX being used as an indicator of the presence of 1,3-dinitrobenzene.

The initial removal of soil at the NODA will involve excavating the top surface soil from those areas visually identified as being contaminated with RDX. Screening samples will be collected from the newly exposed soil in the excavation areas to identify potential hot spots. All samples will be analyzed for RDX using field test kits.

3.7.2 Sampling for Characteristic Determination

A single composite sample will be collected from each of the Land Mine Fuze Burn Area and the NODA stockpiled soils to determine whether the soil exceeds the toxicity characteristic concentrations for 2,4-dinitrotoluene and lead, respectively. Based on the results of the TCLP analyses, soil will either be stabilized prior to disposal (i.e., TCLP concentrations are greater than the 40 CFR 261.24 levels) or direct disposed (i.e., TCLP concentrations are less than the 40 CFR 261.24 levels).

3.7.3 Statistical Sampling Design for Soil

After field screening samples indicate that COC concentrations are below the remediation goals, the statistically based sampling design will be implemented. The number of samples is determined using the following formula in Equation (3-1), as found in Chapter 6 of *Methods for Evaluating the Attainment of Cleanup Standards, Volume 1, Soils and Solid Media* (EPA 1989).

$$n_d = \sigma^2 \left\{ \frac{z_{1-\beta} + z_{1-\alpha}}{C_s - \mu_1} \right\}^2 + \frac{1}{2}\left(z_{1-\alpha}\right)^2 \qquad (3\text{-}1)$$

where

n_d = number of samples

σ^2 = sample variance

$z_{1-\beta}$ = critical value for a false negative

$z_{1-\alpha}$ = critical value for a false positive

C_s = remedial action goal

μ_1 = mean concentration (lower bound of the gray region) where the site should be declared clean.

The standard deviation used in the sample size calculation is estimated as 1/6 of the measurement range, which is conservatively taken to be from zero to two times the cleanup level. Therefore, the standard deviation is equal to 1/3 the cleanup level of $C_S/3$. It is reasonable to assume that the analytical methods are capable of measuring within 15% of the actual concentration; therefore, the mean concentration (μ_1) will be taken to be 85% of the cleanup level or $0.85C_S$. Substituting these into the above equation yields Equation (3-2):

$$n_d = \left(\frac{C_S}{3}\right)^2 \left\{\frac{z_{1-\beta} + z_{1-\alpha}}{C_s - 0.85C_S}\right\}^2 + \frac{1}{2}\left(z_{1-\alpha}\right)^2 \quad (3\text{-}2)$$

Which reduces further to that shown in Equation (3-3):

$$n_d = \left(\frac{1}{3}\right)^2 \left\{\frac{z_{1-\beta} + z_{1-\alpha}}{0.15}\right\}^2 + \frac{1}{2}\left(z_{1-\alpha}\right)^2 \quad (3\text{-}3)$$

The parameters of the selected statistical design for soil that provides the most resource-effective data collection design are summarized as follows:

- Simple random design
- The statistical test of interest is a comparison of the 95% UCL to the remedial action goal
- The false-positive (α) error rate is 5% ($Z_{1-\alpha} = 1.645$)
- The false-negative (β) error rate is 20% ($Z_{1-\beta} = 0.842$)
- The lower bound of the gray region is 80% of the corresponding remedial action goal
- The upper bound of the gray region is the remedial action goal for all soil and COCs.

Therefore, the calculated number of confirmation samples is calculated as shown in Equation (3-4):

$$n_d = \left(\frac{1}{3}\right)^2 \left\{\frac{0.842 + 1.645}{0.15}\right\}^2 + \frac{1}{2}\left(1.645\right)^2 = 16.8 \cong 17 \quad (3\text{-}4)$$

3.7.3.1 Fire Station II Zone and Range Fire Burn Area. The 17 confirmation sample locations will be randomly selected from the field screening sample locations identified during the excavation activities. To determine the validity of the data obtained using the field test kits, 20% of the samples will be sent off-Site for laboratory analysis following the SW-846 Method 8330 (EPA 2002). The data subsets from each of the five remediation sites will be combined and a regression analysis performed to determine whether the laboratory-generated data correlate with the data obtained from the field test kits. If the correlation squared (R^2) is greater than 0.70, the data sets will be considered comparable and the data from the field test kits combined with that from the laboratory will be used to confirm whether the remediation goals have been met for the individual sites. If R^2 is less than 0.70, the data sets will not be considered comparable, and the sites for which 100% of the samples were not submitted for laboratory analysis will be resampled with all samples sent off-Site for laboratory analysis.

After collection and analysis, the 95% UCL will be compared to the final remediation goal for TNT and RDX in the soil. If the data are normally distributed, the null hypothesis will be tested by comparing the 95% UCL to the final remediation goal. Normality of the data will be tested graphically and through use of the Shapiro-Wilk statistic (i.e., a statistical calculation). If data are not normally distributed, then an appropriate transform (i.e., log normal) will be implemented. If transformation of the data is necessary, then the transformed 95% UCL will be compared to the transformed cleanup standard. The transformed 95% UCL shall not be transformed back for comparison to the untransformed cleanup standard. The 95% UCL is given as shown in Equation (3-5):

$$UCL = \bar{x} + \frac{(t \cdot s)}{\sqrt{n}} \quad (3\text{-}5)$$

where

x = population mean

t = test statistic obtained from statistical tables

n = number of samples.

It is important to note that the *t*-value is based on the degrees of freedom or the number of measurements/samples above the instrument detection limit, minus one. Any measurements that are "less-than-detectable" will not be considered in the UCL calculation. However, when calculating the sample population mean, less-than-detectable values will be taken as the calculated instrument detection limit.

3.7.3.2 Experimental Field Station. The 17 confirmation sample locations will be randomly selected from the field screening sample locations identified during the excavation activities. To determine the validity of the data obtained using the field test kits, all of the confirmation samples collected from the Experimental Field Station will be sent off-Site for laboratory analysis following the SW-846 Method 8330. The laboratory-based analysis of all samples collected from the Experimental Field Station is required, because a field test kit for the analysis of 1,3-dinitrobenzene does not exist. As described for the Fire Station II Zone and Range Fire Burn Area, the data subsets from each of the five remediation sites will be combined to determine whether a correlation exists between the field test kits and the laboratory analyses.

After collection and analysis, the 95% UCL will be compared to the final remediation goal for TNT and 1,3-dinitrobenzene in the soil. If the data are normally distributed, the null hypothesis will be tested by comparing the 95% UCL to the final remediation goal. Normality of the data will be tested as described in Section 3.7.3.1 and transformed, if necessary.

3.7.3.3 Land Mine Fuze Burn Area. The 17 confirmation sample locations will be randomly selected from the field screening sample locations identified during excavation activities. To determine the validity of the data obtained using the field test kits, 20% of the confirmation samples collected from the Land Mine Fuze Burn Area will be sent off-Site for laboratory analysis following the SW-846 Method 8330. As described for the Fire Station II Zone and Range Fire Burn Area, the data subsets from each of the five remediation sites will be combined to determine whether a correlation exists between the field test kits and the laboratory analyses.

After collection and analysis, the 95% UCL will be compared to the final remediation goal for TNT in the soil. If the data are normally distributed, the null hypothesis will be tested by comparing the 95% UCL to the final remediation goal. Normality of the data will be tested as described in Section 3.7.3.1 and transformed, if necessary.

3.7.3.4 National Oceanic and Atmospheric Administration. The 17 confirmation sample locations will be randomly selected from the field screening sample locations identified during the excavation activities. To determine the validity of the data obtained using the field test kits, all of the confirmation samples collected from the NOAA will be sent off-Site for laboratory analysis following the SW-846 Method 8330. The laboratory-based analysis of all samples collected from the NOAA is required, because a field test kit for the analysis of 1,3-dinitrobenzene does not exist. As described for

the Fire Station II Zone and Range Fire Burn Area, the data subsets from each of the five remediation sites will be combined to determine whether a correlation exists between the field test kits and the laboratory analyses.

After collection and analysis, the 95% UCL will be compared to the final remediation goal for TNT, RDX, and 1,3-dinitrobenzene in the soil. If the data are normally distributed, the null hypothesis will be tested by comparing the 95% UCL to the final remediation goal. Normality of the data will be tested as described in Section 3.7.3.1 and transformed, if necessary.

3.7.3.5 Naval Ordnance Disposal Area. The 17 confirmation sample locations will be randomly selected from the field screening sample locations identified during the excavation activities. To determine the validity of the data obtained using the field test kits, 20% of the confirmation samples collected from the NODA will be sent off-Site for laboratory analysis following the SW-846 Method 8330. As described for the Fire Station II Zone and Range Fire Burn Area, the data subsets from each of the five remediation sites will be combined to determine whether a correlation exists between the field test kits and the laboratory analyses.

After collection and analysis, the 95% UCL will be compared to the final remediation goal for RDX in the soil. If the data are normally distributed, the null hypothesis will be tested by comparing the 95% UCL to the final remediation goal. Normality of the data will be tested as described in Section 3.7.3.1 and transformed, if necessary.

3.8 Quality Assurance Objectives for Measurement

The quality assurance (QA) objectives for measurement will meet or surpass the minimum requirements for data quality indicators established in the QAPjP (DOE-ID 2004a). This reference provides minimum requirements for the following measurement quality indicators: precision, accuracy, representativeness, detection limits, completeness, and comparability. Precision, accuracy, and completeness will be calculated in accordance with the QAPjP (DOE-ID 2004a).

3.8.1 Precision

Precision is a measure of the reproducibility of measurements under a given set of conditions. In the field, precision is affected by sample collection procedures and by the natural heterogeneity encountered in the environment. Overall precision (field and laboratory) can be evaluated by the use of duplicate samples collected in the field. Typically, greater precision is required for analytes with very low action levels that are close to background concentrations.

Laboratory precision will be based upon the use of laboratory-generated duplicate samples or matrix spike/matrix spike duplicate samples. Evaluation of laboratory precision will be performed during the method data validation process.

Field precision will be based upon the analysis of collected field duplicate or split samples. For samples collected for laboratory analyses, a field duplicate will be collected at a minimum frequency of 1 in 20 environmental samples.

Precision of field screening samples for TNT and RDX will be based on the collection of duplicate samples and duplicate measurements. Duplicate samples and measurements will be collected at a frequency of 1 in 20 field screening samples and 1 in 20 field measurements.

3.8.2 Accuracy

Accuracy is a measure of bias in a measurement system. Laboratory accuracy is demonstrated using laboratory control samples, blind quality control (QC) samples, and matrix spikes. Evaluation of laboratory accuracy will be performed during the method data validation process. Sample handling, field contamination, and the sample matrix in the field affect overall accuracy. False-positive or high-biased sample results will be assessed by evaluating results from field blanks, trip blanks, and equipment rinsates.

Field accuracy will only be determined for samples collected for laboratory analysis. The accuracy of field instrumentation will be ensured through the use of appropriate calibration procedures and standards. In addition, field sample results will be assessed by evaluating results from blank soil samples wherein the soil used for the analysis will be collected from an area immediately adjacent to the contaminated area. The blank soil samples will be analyzed at a frequency of 1 in 20 field screening samples with a minimum of 10% of the blank soil samples also being submitted for laboratory analysis.

3.8.3 Representativeness

Representativeness is a qualitative parameter that expresses the degree to which the sampling and analysis data accurately and precisely represent the characteristic of a population parameter being measured at a given sampling point or for a process or environmental condition. Representativeness will be evaluated by determining whether measurements are made and physical samples are collected in such a manner that the resulting data appropriately measure the media and phenomenon measured or studied. The comparison of all field and laboratory analytical data sets obtained throughout this remedial action will be used to ensure representativeness.

3.8.4 Detection Limits

Detection limits for laboratory analyses will meet or exceed the risk-based or decision-based concentrations for the COCs. Detection limits will be as specified in the Sample and Analysis Management (SAM) laboratory Master Task Agreement statements of work, task order statements of work, and as described in the QAPjP (DOE-ID 2004a).

Detection limits for field instrumentation also will meet or exceed the remedial action goals for the COCs and are discussed in Section 0.

3.8.5 Completeness

Completeness is a measure of the quantity of usable data collected during the field sampling activities. The QAPjP (DOE-ID 2004a) requires that an overall completeness goal of 90% be achieved for noncritical samples. If critical parameters or samples are identified, a 100% completeness goal is specified. Critical data points are those sample locations or parameters for which valid data must be obtained in order for the sampling event to be considered complete. For this project, all field screening data will be considered noncritical with a completeness goal of 90%. The laboratory data collected for confirmation samples will be considered critical with a completeness goal of 100%.

3.8.6 Comparability

Comparability is a qualitative characteristic that refers to the confidence with which one data set can be compared to another. At a minimum, comparable data must be obtained using unbiased sampling designs. If sampling designs are not unbiased, the reasons for selecting another design should be well

documented. Data comparability will be assessed by comparing all data sets collected during this study for the following parameters:

- Data sets will contain the same variables of interest
- Units will be expressed in common metrics
- Similar analytical procedures and QA will be used to collect data
- Time of measurements of variables will be similar
- Measuring devices will have similar detection limits
- Samples within data sets will be selected in a similar manner
- Number of observations will be of the same order of magnitude.

3.9 Data Validation

Method data validation is the process whereby analytical data are reviewed against set criteria to ensure that the results conform to the requirements of the analytical method and any other specified requirements.

All laboratory-generated analytical data will be validated to Level A in accordance with Guide (GDE) -7003, "Levels of Analytical Method Data Validation." Level A validation is the most stringent validation level requiring review of all laboratory QA/QC data as well as raw data generated as a result of the analytical process.

Field-generated data will not be validated. Quality of the field-generated data will be ensured through adherence to established operating procedures and use of equipment calibration (as appropriate).

4. SAMPLING DESIGN SUMMARY

The material presented in this section is intended to support the DQOs summarized in Section 3. Field screening measurements in conjunction with confirmation samples will be collected to support the DQOs presented in Section 3.

4.1 Quality Assurance/Quality Control Samples

The QA samples will be included to satisfy the QA requirements for the field operations in accordance with the QAPjP. The duplicate, blank, and calibration (QA/QC) samples will be analyzed as outlined in Section 3.

4.2 Sampling Locations and Frequency

For the sites being remediated, sampling is required to confirm that the remediation goals and hence the remedial action objectives have been achieved. The following sections discuss the locations and frequency with which samples will be collected from the individual sites covered under this FSP.

4.2.1 Fire Station II Zone and Range Fire Burn Area

Sampling activities at the Fire Station II Zone and Range Fire Burn Area will include the collection of field survey samples and confirmation samples. As excavation activities progress, field survey samples will be collected and analyzed for TNT and RDX using commercially available field test kits to determine when the remedial action goals have been achieved. This process of excavation followed by field survey sampling will continue until the remedial action goals have been achieved for the entire area.

Confirmation samples will be analyzed using field test kits with a subset of 20% sent to an approved analytical laboratory for correlation analysis. Seventeen samples will be collected for analysis from the surface of the exposed soil after it has been determined through the use of field survey analyses that the remediation goals have been achieved. The sample locations will be determined in the field and will be based upon the relative size of the excavated zone within the Fire Station II Zone and Range Fire Burn Area. Based on the results of the analyses, there are two options:

- If the confirmation analyses show that the results are below the remedial action goals for all of the COCs based upon calculation of the 95% UCL, then the remedial action will be considered complete.
- If the confirmation analyses show that the results are above the remedial action goals for any of the COCs based upon calculation of the 95% UCL, additional hot spot excavation will be conducted in the suspected area(s) where the sample(s) were collected and additional confirmation analyses will be performed. This process will be repeated until the analytical results show that the remedial action objectives have been met or until all soil is removed to basalt.

4.2.2 Experimental Field Station

Sampling activities at the Experimental Field Station will follow the same protocol as for the Fire Station II Zone and Range Fire Burn Area. As excavation activities progress, field survey samples will be collected and analyzed for TNT using commercially available field test kits to determine when the remedial action goals have been achieved. It will be assumed that the TNT test kits will be indicative of the 1,3-dinitrobenzene concentrations and that the remedial action goals for 1,3-dinitrobenzene have been met if the goals for TNT have been achieved.

Because a field test kit does not exist for the analysis of 1,3-dinitrobenzene, all confirmation samples will be collected and submitted to an off-Site laboratory for nitroaromatic analyses. Seventeen samples will be collected for analysis from the surface of the exposed soil after it has been determined through the use of field survey analyses that the remediation goals have been achieved.

4.2.3 Land Mine Fuze Burn Area

Sampling activities at the Land Mine Fuze Burn Area will follow the same protocol as described in Section 4.2.1. As excavation activities progress, field survey samples will be collected and analyzed for TNT using commercially available field test kits to determine when the remedial action goals have been achieved for a given zone. Following excavation, a composite sample consisting of five subsamples will be collected from the stockpiled soil to determine whether the excavated soil exhibits the toxicity characteristic for 2,4-dinitrotoluene.

4.2.4 National Oceanic and Atmospheric Administration

Sampling activities at the NOAA site will follow the same protocol as described in Section 4.2.1. As excavation activities progress, field survey samples will be collected and analyzed for TNT and RDX using commercially available field test kits to determine when the remedial action goals have been achieved for a given zone. It will be assumed that the TNT and RDX field test kits will be indicative of the 1,3-dinitrobenzene concentrations and the remedial action goals for 1,3-dinitrobenzene have been met if the goals for TNT and RDX have been achieved. As previously discussed in Section 4.2.2, a field test kit does not exist for the analysis of 1,3-dinitrobenzene; therefore, all confirmation samples will be collected and submitted to an off-Site laboratory for nitroaromatic analyses.

4.2.5 Naval Ordnance Disposal Area

Sampling activities at the NODA will follow the same protocol as described in Section 4.2.1. As excavation activities progress, field survey samples will be collected and analyzed for RDX using commercially available field test kits to determine when the remedial action goals have been achieved for a given zone. Following excavation, a composite sample consisting of five subsamples will be collected from the stockpiled soil to determine whether the excavated soil exhibits the toxicity characteristic for lead. Confirmation samples will be analyzed using field test kits with a subset of 20% sent to an approved analytical laboratory for correlation analysis.

5. SAMPLING DESIGNATION

5.1 Sample Identification Code

A systematic character identification (ID) code will be used to uniquely identify all confirmation samples. Uniqueness is required for maintaining consistency and preventing the same ID code from being assigned to more than one sample.

The first two designators of the code, *TR,* refer to the sample originating in support of the TNT/RDX remedial action. The third and fourth designators correspond to the specific area from which the sample is being collected, as follows:

- 11—Fire Station II Zone and Range Fire Burn Area
- 12—Experimental Field Station
- 13—Land Mine Fuze Burn Area
- 14—NOAA
- 15—NODA.

The next two numbers designate the sequential sample number collected from a given area. A two-character set (i.e., 01, 02) will be used to designate field duplicate samples. The last two characters refer to a particular analysis and bottle type. Refer to the SAP tables in Appendix A for specific bottle code designations.

For example, a soil sample collected in support of confirming the nitroaromatic concentrations at the Fire Station II Zone and Range Fire Burn Area might be designated as TR110101N7 where (from left to right):

- **TR** designates the sample as originating in support of the TNT/RDX remedial action
- **11** corresponds to the sample being collected from the Fire Station II Zone and Range Fire Burn Area
- **01** designates the sequential sample number
- **01** designates the type of sample (01 = original, 02 = field duplicate)
- **N7** designates nitroaromatic analysis.

A SAP table/database will be used to record all pertinent information associated with each sample ID code.

5.2 Sampling and Analysis Plan Table/Database

5.2.1 Sampling and Analysis Plan Table

A SAP table format was developed to simplify the presentation of the sampling scheme for project personnel. The following sections describe the information recorded in the SAP table/database, which is presented in Appendix A.

5.2.2 Sample Description

The sample description fields contain information relating individual sample characteristics.

5.2.2.1 Sampling Activity. The sampling activity field contains the first six characters of the assigned sample number. The sample number in its entirety will be used to link information from other sources (i.e., field data, analytical data) to the information in the SAP table for data reporting, sample tracking, and completeness reporting. The analytical laboratory also will use the sample number to track and report analytical results.

5.2.2.2 Sample Type. Data in this field will be selected from the following:

- REG—for a regular sample
- QC—for a QC sample.

5.2.2.3 Media. Data in this field will be selected from the following:

- SOIL—for soil samples
- WATER—for QA/QC water samples.

5.2.2.4 Collection Type. Data in this field will be selected from the following:

- GRAB—for grab sample collection
- RNST—for rinsate QA/QC samples
- DUP—for field duplicate samples
- FBLK—for field blank QA/QC samples.

5.2.2.5 Planned Date. This date is related to the planned sample collection start date.

5.2.3 Sample Location Fields

This group of fields pinpoints the exact location for the sample in three-dimensional space, starting with the general AREA, narrowing the focus to an exact location geographically, and then specifying the DEPTH in the depth field.

5.2.3.1 Area. The AREA field identifies the general sample collection area. This field should contain the standard identifier for the INEEL area being sampled. For this investigation, the AREA field identifier will correspond to one of the five sites being remediated. The site codes associated with the five sites are as follows:

- ORD-10—Fire Station II Zone and Range Fire Burn Area
- ORD-15—Experimental Field Station
- ORD-24—Land Mine Fuze Burn Area
- ORD-08—NOAA
- ORD-06—NODA.

5.2.3.2 Location. The LOCATION field may contain geographical coordinates, x-y coordinates, building numbers, or other location-identifying details as well as program-specific information such as borehole or well number. Data in this field will normally be subordinated to the AREA. This information is included on the labels generated by the SAM Program to aid sampling personnel.

5.2.3.3 Type of Location. The TYPE OF LOCATION field supplies descriptive information concerning the exact sample location. Information in this field may overlap that in the location field, but it is intended to add detail to the location.

5.2.3.4 Depth. The DEPTH of a sample location is the distance in feet from surface level or a range in feet from the surface.

5.2.4 Analysis Types (AT1–AT2O)

The AT1–AT20 fields indicate analysis types (i.e., radiological, chemical, and hydrological). Space is provided at the bottom of the form to clearly identify each type. A standard abbreviation also should be provided if possible.

6. SAMPLING PROCEDURES AND EQUIPMENT

The following sections describe the sampling procedures and equipment to be used for the planned sampling and analyses described in this FSP. Before commencement of any sampling activities, a prejob briefing will be held to review the requirements of the FSP and the project HASP (ICP 2004) and to ensure that all supporting documentation has been completed.

6.1 Sampling Requirements

Sampling requirements for Phase II of the OU 10-04 remedial action sampling are outlined in the following sections. Table 6-1 provides the requirements for sample containers, preservation methods, sample volumes, and holding times for soil and QA/QC samples. The specific analyses required are provided in Section 3.

Table 6-1. Specific sample requirements for the Operable Unit 10-04 Phase II remedial action.

Analytical Parameter	Container		Sample Matrix	Preservative	Analytical Method	Holding Time
	Size	Type				
Nitroaromatics[a]	4 oz	AWM[b] glass	Soil	Cool to 4°C.	SW-846 Method 8330	14 days to extraction/ 40 days after extraction
Nitroaromatics[a]	1 L	Amber glass	Water	0.008% $Na_2S_2O_3$[c] Cool to 4°C.	SW-846 Method 8330	7 days to extraction/ 40 days after extraction
TCLP Lead[d]	250 mL	WM[e] glass or plastic	Soil	Cool to 4°C.	SW-846 1311/6010	6 months
TCLP SVOCs[e]	250 mL	WM[e] glass	Soil	Cool to 4°C.	SW-846 1311/8270	7 days to extraction/ 40 days after extraction

a. The sampling and analysis plan table will specify specific contaminants for which the sample will be analyzed.
b. AWM = amber wide-mouth
c. If residual chlorine is present, add 80 mg of sodium thiosulfate ($Na_2S_2O_3$) per liter of sample.
d. TCLP = toxicity characteristic leaching procedure
e. WM = wide-mouth
f. SVOC = semivolatile organic compound

6.1.1 Field Measurements

Field screening samples will be collected in support of the remedial activities at the OU 10-04 sites to guide excavation and to support the decision that the remedial action objectives have been met for the individual sites. The following sections describe the field screening methods and the associated project requirements associated with the measurement systems.

6.1.1.1 Trinitrotoluene Field Test Kit. The TNT EnSys Soil Test System will be used to provide rapid quantitative field screening results. The effective concentration range of the test is between 1 and 30 ppm with a standard deviation of 8% and a minimum detection limit of 0.7 ppm. The soil test kit

system will be used with either the Hach Model #DR/2000 or #DR/2010 spectrophotometer. The spectrophotometer will be prepared for operation in accordance with the procedure provided by the manufacturer. Soil samples will be air-dried before analysis to minimize analytical variation.

The basic analytical approach involves weighing an aliquot of the soil sample followed by extraction with acetone. The extract is filtered to remove sediment and the filtrate dispensed in a sample cuvette for final preparation and analysis in the spectrophotometer. A TNT control sample shall be analyzed each day prior to sample analysis. For sample concentrations greater than the effective concentration range of the method (i.e., 30 ppm), the sample extract shall be further diluted with acetone until the sample concentration falls within the effective range. Analytical results are interpreted in accordance with the manufacturer's instructions.

6.1.1.2 Royal Demolition Explosive Field Test Kit. The RDX EnSys Soil Test System will be used to provide rapid quantitative field screening results. The effective concentration range of the test is between 1 and 30 ppm with a standard deviation of 10% and a minimum detection limit of 0.8 ppm. The soil test kit system will be used with either the Hach Model #DR/2000 or #DR/2010 spectrophotometer. The spectrophotometer will be prepared for operation in accordance with the procedure provided by the manufacturer. Soil samples will be air-dried before analysis to minimize analytical variation.

The basic analytical approach involves weighing an aliquot of the soil sample followed by extraction with acetone. The extract is filtered to remove sediment and the filtrate dispensed in a reaction vial for reaction with NitriVer powder and color development. The contents are expelled into the sample cuvette for analysis in the spectrophotometer. An RDX control sample shall be analyzed each day prior to sample analysis. For sample concentrations greater than the effective concentration range of the method (i.e., 30 ppm), the sample extract shall be further diluted with acetone until the sample concentration falls within the effective range. Analytical results are interpreted in accordance with the manufacturer's instructions.

6.1.2 Surface Soil Sampling

Samples will be collected from surface soil following excavation to guide the continued excavation of soil, if needed, and to confirm that the remediation goals have been achieved. The surface soil samples will be collected following the procedures outlined in GDE-155, "Collecting Samples Using Scoops, Spoons, and Shovels." All surface samples to be analyzed for nitroaromatics will be spatial composites of five subsamples collected from the four corners and the center of the excavated plots. The samples will be collected between 0 to 7.6 cm (0 to 3 in.) in depth using a decontaminated trowel, spoon, or shovel. If soil conditions are not conducive to sampling by this method, either a thief sampler or hand auger may be used. Sampling methods employed will be noted in the sampling logbook.

Each subsample will be sieved, using a stainless steel spoon, through a 2-mm (0.08-in.) mesh stainless steel screen into a disposable aluminum pan. This procedure will be conducted at each of the subsample points to remove all large rocks and debris. Following the collection of all subsamples, the soil in the aluminum pan will be thoroughly mixed with the stainless steel spoon. Sample containers will be filled from this composite. Sample material left over will be returned to the sample grid from which it originated.

Decontamination of sampling equipment will be performed in accordance with GDE-162, "Decontaminating Sampling Equipment." Dry decontamination methods will be used to the extent practicable to minimize the generation of liquid decontamination waste.

6.2 Handling and Disposition of Sampling Residues and Related Waste

Remediation waste will be generated during the sampling activities as described herein. Waste generated at all sites will be considered nonhazardous and not characteristic for RCRA constituents. Samples will be handled in accordance with MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment." All waste streams generated from the sampling activity will be characterized in accordance with MCP-62, "Waste Generator Services—Low-Level Waste Management," and will be handled, stored, and disposed of accordingly.

Waste will be generated as a result of the sampling activities conducted during this project. Waste expected to be generated during the sampling includes the following:

- Personal protective equipment (PPE)
- Unused/unaltered sample material
- Analytical residues
- Sample containers
- Miscellaneous waste
- Contaminated equipment.

As sampling continues, additional waste streams may be identified. All new waste streams projected, as well as those identified above, are required to have the waste identified and characterized. A hazardous waste determination will be completed for all waste generated during the OU 10-04 Phase II remedial action.

The waste associated with the sampling activities will be managed in a manner that complies with the established applicable or relevant and appropriate requirements (ARARs), protects human health and the environment, and achieves minimization of remediation waste to the extent possible. The ARARs applicable to the storage of waste are defined in accordance with the ROD (DOE-ID 2002). The basic provisions of the ARARs provide for appropriate waste containerization and compliant storage of the remediation waste for an interim storage period. Protection of human health and the environment is achieved through implementation of the ARARs and through implementation of the waste management approach described herein.

6.2.1 Waste Minimization

Waste minimization techniques will be incorporated into planning and daily work practices to improve worker safety and efficiency. In addition, such techniques will aid in reducing the project environmental and financial liability. Specific waste minimization practices to be implemented during the project will include, but not be limited to, the following:

- Excluding materials that could become hazardous waste in the decontamination process (if any)
- Controlling transfer between clean and contaminated zones

- Designing containment such that contamination spread is minimized
- Collecting all samples necessary at one time, such that additional waste is not generated due to resampling.

The *U.S. Department of Energy Idaho Operations Office Idaho National Engineering and Environmental Laboratory Interim Pollution Prevention Plan* (Janke 2000) addresses the efforts to be expended and the reports required to track waste generated by projects. This plan directs that the volume of waste generated by INEEL operations will be reduced as much as possible.

Industrial waste does not require segregation by type; therefore, containers will be identified as industrial waste and maintained outside the controlled area for separate collection. Containers for collection of contaminated waste will be clearly labeled to identify waste type and will be maintained inside the controlled area as defined in the project HASP (ICP 2004) until removal for subsequent management.

6.2.2 Laboratory Samples

As part of the contract for the subcontracted laboratory, all laboratory and sample waste is managed in accordance with the SAM master task agreements. The laboratory will dispose of any unused sample material. The laboratories are responsible for any waste generated as a result of analyzing the samples. In the event that unused sample material must be returned from the laboratory, only the unused and unaltered samples in the original sample containers will be accepted from the laboratory. These samples will be returned to the waste stream from which they originated. If the laboratory must return altered sample material (e.g., analytical residue), the laboratory will specifically define the types of chemical additives used in the analytical process and assist in making a hazardous waste determination. This information will be provided to the project field team leader and environmental compliance coordinator. Management of this waste also will require separation from the other unaltered samples being returned.

6.2.3 Packaging and Labeling

Containers used to store and transport hazardous waste must meet the requirements of 40 CFR 264, Subpart I, "Use and Management of Containers." The *Idaho National Engineering and Environmental Laboratory Waste Acceptance Criteria* (DOE-ID 2004e) contains additional details concerning packaging and container conditions. Appropriate containers for RCRA waste include 208-L (55-gal) drums and other suitable containers that meet the U.S. Department of Transportation (DOT) regulations on packaging (49 CFR 171, 173, 178, and 179) or Sections 4.4, 4.5, and 4.6 of the *Idaho National Engineering and Environmental Laboratory Waste Acceptance Criteria* (DOE-ID 2004e). Waste Generator Services (WGS) will be consulted to ensure that the packaging is acceptable to the receiving facility.

Waste containers will be labeled with standard hazardous waste labels. The following information will be included on the labels:

- Unique bar code serial number
- Name of generating facility
- Phone number of generator contact
- Listed or characteristic waste code(s)
- Waste package gross weight

- Waste stream or material identification number as assigned by the receiving facility
- Before shipping, other labels and markings as required by 49 CFR 172, Subparts D and E.

Any of the above information that is not known when the waste is labeled may be added when the information is known.

The unique bar code serial number is used for tracking and consists of a five-digit number followed by a single alpha designator. The alpha designator indicates which facility generated the bar code. Presently, only the Waste Reduction Operations Complex generates the bar codes, and their alpha designator is "K." The Waste Reduction Operations Complex will furnish these bar codes in lots of 50. A new bar code will be affixed to each container when waste is first placed in the container.

Any waste shipped off the INEEL from WAG 10 must be labeled in accordance with applicable DOT labels and markings (49 CFR 172). In addition, waste labels must be visible, legibly printed or stenciled, and placed so that a full set of labels and markings are visible. See Sections 4.4, 4.5, or 4.6 of the *Idaho National Engineering and Environmental Laboratory Waste Acceptance Criteria* (DOE-ID 2004e) for additional labeling information.

6.2.4 Storage and Inspection

Waste may be stored in the CERCLA waste storage unit (CWSU) already established at CFA. Solid waste, segregated as potentially hazardous and placed in 208-L (55-gal) drums, will be stored in the CWSU. If required because of space limitations, a new CERCLA storage area (CSA) might need to be established as the sampling progresses. Determination of the CSA location will be coordinated with and approved by the appropriate CFA personnel. Waste placed in wooden storage boxes ($1.2 \times 1.2 \times 2.4$ m [$4 \times 4 \times 8$ ft] and $0.6 \times 1.2 \times 2.4$ m [$2 \times 4 \times 8$ ft]), or other suitable containers, will be stored outside in a roped-off area and maintained as a CSA.

To meet the substantive requirements of 40 CFR 264, Subpart I, the RCRA ARAR inspection of the CWSU and/or CSA will be conducted as part of the weekly waste container inspection. The purposes of the weekly container inspection are to look for containers that are leaking and/or that are deteriorating because of corrosion or other factors, to ensure that the containment system has not deteriorated due to corrosion, and to verify that labels are in place and legible. Inspections of the containers and the CWSU/CSA are conducted to meet the guidance contained in ICP-MCP-3475, "Temporary Storage of CERCLA-Generated Waste at the INEEL Site." The inspections will be documented on a weekly inspection form when completed. The checklists used to guide the inspection will be maintained in the CWSU/CSA.

6.2.5 Personal Protective Equipment

The PPE requiring disposal may include, but not be limited to, the following: gloves, respirator cartridges, shoe covers, and coveralls. The PPE will be disposed of in accordance with the requirements set forth in the *Idaho National Engineering and Environmental Laboratory Waste Acceptance Criteria* (DOE-ID 2004e).

6.2.6 Hazardous Waste Determinations

All waste generated will be characterized as required by 40 CFR 262.11, "Hazardous Waste Determination." Hazardous waste determinations will be prepared for all waste streams in accordance with the requirements set forth in MCP-63, "Waste Generator Services—Industrial Waste Management."

Completed hazardous waste determinations will be maintained for all waste streams as part of the project file held by WGS. In addition, the excavated soil will require characterization to verify that they meet the disposal facility's waste acceptance criteria. The hazardous waste determinations may use two approaches to determine whether a waste is characteristic and meets the disposal facility's waste acceptance criteria:

1. Process knowledge may be used if there is sufficient existing information to characterize the waste. Process knowledge may include direct knowledge of the contamination source and/or existing validated analytical data.

2. Analysis of representative waste stream samples may be performed according to specialized RCRA protocols or standard protocols for sampling and laboratory analysis that are not specialized RCRA methods and other equivalent regulatory-approved methods. In addition, process knowledge and previous sampling activities could influence the amount of sampling and analysis required in order to perform characterization. It is anticipated that additional sampling will not be required by INEEL CERCLA Disposal Facility (ICDF) waste acceptance criteria.

Land disposal restrictions for hazardous waste are addressed in 40 CFR 268, "Land Disposal Restrictions." The INEEL-specific requirements for treatment, storage, and disposal are addressed in the *Idaho National Engineering and Environmental Laboratory Waste Acceptance Criteria* (DOE-ID 2004e). After the hazardous waste determinations are completed, the INEEL Interim Waste Tracking System profile number is assigned as specified in *ICDF Complex Material Profile Guidance* (DOE-ID 2003), and the appropriate information is entered into the tracking system.

6.2.7 Waste Disposition

At the conclusion of the investigations, or when deemed necessary, industrial waste will be dispositioned to the INEEL landfill, following the protocols and completing the forms identified in the *Idaho National Engineering and Environmental Laboratory Waste Acceptance Criteria* (DOE-ID 2004e). To achieve this waste management activity, industrial waste will be turned over to CFA Operations personnel for management under existing facility waste streams and in accordance with standing facility procedures. When sufficient quantities of waste have been accumulated to ship to one of the INEEL waste management units, or off the INEEL to a commercial waste management facility, WGS will be contacted and the appropriate forms will be completed and submitted for approval, as required. The waste generator interface will provide assistance in packaging and transporting the waste.

Waste that is determined to be RCRA hazardous is not intended to be stored in a permitted treatment, storage, and disposal facility. However, if this becomes necessary, it will be labeled as CERCLA to facilitate eventual management in accordance with CERCLA treatment, storage, or disposal that may become available. Should further characterization of the contaminated waste be necessary, services will be requested from environmental monitoring and the SAM Program. Requesting these services requires completion of "Sample and Analytical Service Authorization Form (SAF)" on website http://webhome4/SampAna/. For final disposition of RCRA hazardous waste, WGS will be contacted to determine whether the waste qualifies for disposal under terms of existing subcontracts.

Management of contaminated waste, generated at a subcontract laboratory during analytical testing, will be the responsibility of the subcontract laboratory. However, overall management of the samples must be performed in accordance with the requirements of MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment." Specifically, the MCP requires that the facility Environmental, Safety, and Health manager provide written approval prior to the return of any media and that written documentation of sample disposition be developed and maintained. To initiate the return of the waste to the INEEL, the subcontract laboratory will notify the contractor in the form of a written

report identifying the known volume and characteristics of each waste type, including shipping and packaging details. Final authorization for the return of waste will be provided in writing from the contractor to the subcontract laboratory. In the event that laboratory waste is returned, WGS will be contacted and they will determine the disposition of the waste.

6.2.8 Recordkeeping and Reporting

Records and reports related to waste management must be maintained as indicated by ICP-MCP-3475, "Temporary Storage of CERCLA-Generated Waste at the INEEL Site." Others may complete some of these records and reports, but they must be available either at the CFA sites or with the WAG 10 project files. These records will include, but not be limited to, the following:

- Hazardous waste determinations, characterization information, and statements of process knowledge (by others)
- CWSU and CSA inspection reports and log-in, log-out history
- Training records
- Documentation with respect to all spills.

6.3 Project-Specific Waste Streams

Several distinct waste stream types anticipated to be generated during this project have been identified. Some of these waste types will be clean, but many could be contaminated. Subsequent to generation, any or all of the waste may be reclassified; therefore, the intended waste management strategies for each are outlined in Sections 6.3.1 through 6.3.6. These sections describe the expected sampling waste that will require compliant storage and/or disposal, including the intended management strategy from the time of generation until final disposition. Field and laboratory personnel will be responsible for segregating the waste. The anticipated quantities also have been approximated; however, they are considered a rough order-of-magnitude because, in some cases, the type of contamination present cannot be determined before sampling and analysis. Estimated waste volumes are based on historical sampling activities conducted in support of other CERCLA actions conducted at the INEEL.

6.3.1 Personal Protective Equipment

The PPE in the form of coveralls, leather and rubber gloves, shoe covers or boots, and other anti-contamination clothing may be generated during the sampling activities. The anticipated quantity of PPE to be generated and requiring disposal as a result of the sampling activities for each of the sites is 0.76 m^3 (1 yd^3), classified as conditional industrial.

6.3.2 Unused/Unaltered Sample Material

Unused/unaltered sample material will be generated from the sampling activities in the form of soil not required for sampling and analysis. Generally, the analytical laboratory will be responsible for disposal of the unused/unaltered sample material. In those cases where samples must be returned from the laboratory, this excess material will be managed in accordance with MCP-3002, "Managing Disturbed Soils." Whenever possible, all unused/unaltered sample material received by the INEEL for disposal will be returned to the point of origin. Conditions that may preclude the return of soil to the original sampling location include, but are not limited to, the following:

- Soil layer might have been excavated
- Backfill material might have been placed over the sample location
- Analytical results show that the sample material contains contaminants in excess of the remedial action goals.

If conditions preclude the return of unused/unaltered sample material to the point of origin, then the sample material will require disposal at an approved facility such as the ICDF.

6.3.3 Analytical Residues

Analytical residues will be generated from the sample analytical activities conducted by subcontracted and/or on-Site laboratories. Although the laboratories are required to dispose of analytical residues under terms of the subcontract, the potential does exist for return of analytical residues. The anticipated quantity of analytical residues to be generated and requiring disposal as a result of the field sampling activities is 0.76 m^3 (1 yd^3), classified as conditional industrial.

6.3.4 Sample Containers

Sample containers will become a waste stream following analyses. The sample containers will be wiped clean. The sample containers will be disposed of as conditional industrial waste at the CFA landfill. The anticipated quantity of sample containers to be generated and requiring disposal as a result of the field sampling activities is 0.76 m^3 (1 yd^3), classified as conditional industrial.

6.3.5 Miscellaneous Waste

Miscellaneous waste such as trash, labels, rags, wipes, and other miscellaneous debris might be generated during the field sampling activities. Clean miscellaneous waste will be removed to the CFA landfill. The anticipated quantity of miscellaneous waste to be generated and requiring disposal as a result of the field sampling activities is 1.53 m^3 (2 yd^3), classified as conditional industrial.

6.3.6 Contaminated Sampling Equipment

Contaminated equipment will become a waste stream in the event that it cannot be decontaminated or reused for another project and disposal is required. Contaminated sampling equipment (e.g., hand augers, spoons, pans, and screens) will be expected to be decontaminated.

7. DOCUMENTATION MANAGEMENT AND SAMPLE CONTROL

Section 7.1 summarizes document management and sample control. Documentation includes field logbooks used to record field data and sampling procedures. Section 7.2 outlines the sample handling and discusses chain of custody for shipment to the analytical laboratory. The analytical results from this sampling effort will be documented in the remedial action report.

7.1 Documentation

The field team leader will be responsible for controlling and maintaining all field documents and records and for ensuring that all required documents will be submitted to the ICP Administrative Records and Document Control Center. All entries will be made in permanent ink. All errors will be corrected by drawing a single line through the error and entering the correct information. All corrections will be initialed and dated.

7.1.1 Sample Container Labels

Waterproof, gummed labels generated from the SAP database will display information such as the sample ID number, the name of the project, sample location, and analysis type. In the field, labels will be completed and placed on the containers before collecting the sample. Information concerning sample date, time, preservative used, field measurements of hazards, and the sampler's initials will be filled out during field sampling.

7.1.2 Field Guidance Forms

Field guidance forms provided for each sample location will be generated from the SAP database to ensure unique sample numbers. Used to facilitate sample container documentation and organization of field activities, these forms contain information regarding the following:

- Media
- Sample ID numbers
- Sample location
- Aliquot ID
- Analysis type
- Container size and type
- Sample preservation.

7.1.3 Field Logbooks

In accordance with the Administrative Records and Document Control format, field logbooks will be used to record information necessary to interpret the analytical data. All field logbooks will be controlled and managed according to MCP-1194, "Logbook Practices for ER and D&D&D Projects."

7.1.3.1 Sample/Shipping Logbooks. The field team will use sample logbooks. Each sample logbook will contain information such as the following:

- Physical measurements (if applicable)
- All QC samples
- Sample date, time, and location
- Shipping information (e.g., collection dates, shipping dates, cooler ID number, destination, COC number, and name of shipper).

7.1.3.2 Field Team Leader's Daily Logbook. An operational logbook maintained by the field team leader will contain a daily summary of the following:

- All the project field activities
- Problems encountered
- Visitor log
- List of site contacts.

This logbook will be signed and dated at the end of each day's sampling activities.

7.1.3.3 Field Instrument Calibration/Standardization Logbook. A logbook containing records of calibration data will be maintained for each piece of equipment requiring periodic calibration or standardization. This logbook will contain log sheets to record the date, time, method of calibration, and instrument ID number.

7.2 Sample Handling

All samples will be handled in accordance with MCP-9228, "Environmental Sample Management." Qualified (SAM-approved) analytical and testing laboratories will be used to analyze the samples. Analytical samples for analyses will be collected in precleaned bottles and packaged in accordance with Section 2.3.2.1, "Sample Containers," in the QAPjP (DOE-ID 2004a).

7.2.1 Sample Preservation

Preservation of water samples will be performed immediately upon sample collection. If required for preservation, acid may be added to the bottles prior to sampling. For samples requiring controlled temperatures of 4°C (39°F) for preservation, the temperature will be checked periodically before shipment to certify adequate preservation. Ice chests (coolers) containing frozen, reusable ice will be used to chill the samples, if required, in the field after sample collection.

7.2.2 Chain-of-Custody Procedures

The chain-of-custody procedures will be followed in accordance with the requirements of Program Requirements Document (PRD) -5030, "Environmental Requirements for Facilities, Processes, Materials, and Equipment"; MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment"; MCP-1192, "Chain-of-Custody and Sample Labeling for ER and D&D&D Projects"; and

the QAPjP (DOE-ID 2004a). Sample bottles will be stored in a secured area that is accessible only to the field team members. For field screening samples that remain under control of the field team and are not transferred to another entity for analysis, formal written chain of custody will not be required.

7.2.3 Transportation of Samples

Samples will be shipped in accordance with the regulations issued by the DOT (49 CFR 171–178) and EPA sample handling, packaging, and shipping methods (40 CFR 261.4[d]). All samples will be packaged in accordance with the requirements set forth in MCP-3480 and PRD-5030.

7.2.3.1 Custody Seals. Custody seals will be placed on all shipping containers in such a way as to ensure that sample integrity is not compromised by tampering or unauthorized opening. Clear plastic tape will be placed over the seals to ensure that the seals are not damaged during shipment.

7.2.3.2 On-Site and Off-Site Shipping. An on-Site shipment is any transfer of material within the perimeter of the INEEL. Site-specific requirements for transporting samples within Site boundaries and those required by the shipping/receiving department will be followed. Shipment within the INEEL boundaries will conform to DOT requirements, as stated in 49 CFR, "Transportation." Off-Site sample shipment will be coordinated with Packaging and Transportation personnel, as necessary, and will conform to all applicable DOT requirements.

7.3 Document Revision Requests

Revisions to this document will follow MCP-233, "Process for Developing, Releasing, and Distributing ER Documents (Supplemental to MCP-135 & MCP-9395)."

8. REFERENCES

40 CFR 261.4, 2004, "Exclusions," *Code of Federal Regulations,* Office of the Federal Register, May 2004.

40 CFR 261.24, 2004, "Toxicity Characteristic," *Code of Federal Regulations,* Office of the Federal Register, May 2004.

40 CFR 262.11, 2004, "Hazardous Waste Determination," *Code of Federal Regulations,* Office of the Federal Register, April 2004.

40 CFR 264, Subpart I, 2004, "Use and Management of Containers," *Code of Federal Regulations,* Office of the Federal Register, June 2004.

40 CFR 268, 2004, "Land Disposal Restrictions," *Code of Federal Regulations,* Office of the Federal Register, March 2004.

40 CFR 300, 2004, "National Oil and Hazardous Substances Pollution Contingency Plan," *Code of Federal Regulations,* Office of the Federal Register, July 2004.

49 CFR, 2004, "Transportation," *Code of Federal Regulations,* Office of the Federal Register, July 2004.

49 CFR 171, 2004, "General Information, Regulations, and Definitions," *Code of Federal Regulations,* Office of the Federal Register, June 2004.

49 CFR 172, 2004, "Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements," *Code of Federal Regulations,* Office of the Federal Register, July 2004.

49 CFR 172, Subpart D, 2004, "Marking," *Code of Federal Regulations,* Office of the Federal Register, July 2004.

49 CFR 172, Subpart E, 2004, "Labeling," *Code of Federal Regulations,* Office of the Federal Register, July 2004.

49 CFR 173, 2004, "Shippers—General Requirements for Shipments and Packagings," *Code of Federal Regulations,* Office of the Federal Register, June 2004.

49 CFR 174, 2004, "Carriage by Rail," *Code of Federal Regulations,* Office of the Federal Register, June 2004.

49 CFR 175, 2004, "Carriage by Aircraft," *Code of Federal Regulations,* Office of the Federal Register, June 2004.

49 CFR 176, 2004, "Carriage by Vessel," *Code of Federal Regulations,* Office of the Federal Register, June 2004.

49 CFR 177, 2004, "Carriage by Public Highway," *Code of Federal Regulations,* Office of the Federal Register, June 2004.

49 CFR 178, 2004, "Specifications for Packagings," *Code of Federal Regulations,* Office of the Federal Register, June 2004.

49 CFR 179, 2004, "Specifications for Tank Cars," *Code of Federal Regulations,* Office of the Federal Register, January 2004.

42 USC § 6901 et seq., 1976, "Resource Conservation and Recovery Act (Solid Waste Disposal Act)," *United States Code*, October 21, 1976.

DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory,* Administrative Docket No. 1088-06-29-120, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Health and Welfare, December 4, 1991.

DOE-ID, 1992, *Declaration of the Record of Decision for the Ordnance Interim Action, Operable Unit 10-05, Waste Area Group 10*, Doc. ID 5137, Rev. 0, U.S. Department of Energy Idaho Operations Office, June 1992.

DOE-ID, 1998, *Preliminary Scoping Track 2 Summary Report for Operable Unit 10-03 Ordnance,* DOE/ID-10566, Rev. 0, Volumes 1 and 2, U.S. Department of Energy Idaho Operations Office, January 1998.

DOE-ID, 1999, *Field Sampling Plan for Operable Unit 10-04 Explosive Compounds,* DOE/ID-10624, Rev. 0, U.S. Department of Energy Idaho Operations Office, April 1999.

DOE-ID, 2001, *Comprehensive Remedial Investigation/Feasibility Study for Waste Area Groups 6 and 10 Operable Unit 10-04,* DOE/ID-10807, Rev. 0, Volumes I and II, U.S. Department of Energy Idaho Operations Office, August 2001.

DOE-ID, 2002, *Record of Decision, Experimental Breeder Reactor-I/Boiling Water Reactor Experiment Area and Miscellaneous Sites, Operable Units 6-05 and 10-04*, DOE/ID-10980, Rev. 0, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Environmental Quality, November 2002.

DOE-ID, 2003, *ICDF Complex Material Profile Guidance,* DOE/ID-11046, Rev. 0, U.S. Department of Energy Idaho Operations Office, February 2003.

DOE-ID, 2004a, *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Deactivation, Decontamination, and Decommissioning*, DOE/ID-10587, Rev. 8, U.S. Department of Energy Idaho Operations Office, March 2004.

DOE-ID, 2004b, *Remedial Design/Remedial Action Work Plan for Operable Units 6-05 and 10-04, Phase II*, DOE/NE-ID-11127, Rev. 0, U.S. Department of Energy Idaho Operations Office, August 2004.

DOE-ID, 2004c, *Operations and Maintenance Plan for Operable Units 6-05 and 10-04, Phase II*, DOE/NE-ID-11130, Rev. 0, U.S. Department of Energy Idaho Operations Office, August 2004.

DOE-ID, 2004d, *INEEL Comprehensive Facility and Land Use Plan*, DOE/ID-10514, http://mceris.inel.gov/, U.S. Department of Energy Idaho Operations Office, June 2004.

DOE-ID, 2004e, *Idaho National Engineering and Environmental Laboratory Waste Acceptance Criteria,* DOE/ID-10381, Rev. 20, U.S. Department of Energy Idaho Operations Office, June 2004.

EPA, 1989, *Methods for Evaluating the Attainment of Cleanup Standards, Volume 1: Soils and Solid Media*, PB89-234959, U.S. Environmental Protection Agency, February 1989.

EPA, 1994, *Guidance for the Data Quality Objectives Process,* EPA QA/G-4, EPA/600/R-96/055, Office of Research and Development, U.S. Environmental Protection Agency, September 1994.

EPA, 2002, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Rev. 5, U.S. Environmental Protection Agency, Office of Solid Waste, August 2002.

GDE-155, 2003, "Collecting Samples Using Scoops, Spoons, and Shovels," Rev. 0, *Environmental Services Project Characterization Sampling Handbook,* Idaho National Engineering and Environmental Laboratory, April 2003.

GDE-162, 2004, "Decontaminating Sampling Equipment," Rev. 1, *Environmental Services Project Characterization Sampling Handbook,* Idaho National Engineering and Environmental Laboratory, April 2004.

GDE-7003, 2004, "Levels of Analytical Method Data Validation," Rev. 2, S*ample and Analysis Administrative Manual,* Idaho Completion Project, March 2004.

ICP, 2004, *Health and Safety Plan for the Waste Area Group 10 Remedial Actions at Trinitrotoluene and Royal Demolition Explosive-Contaminated Sites*, ICP/EXT-03-00119, Rev. 0, U.S. Department of Energy Idaho Operations Office, July 2004.

ICP-MCP-3475, 2004, "Temporary Storage of CERCLA-Generated Waste at the INEEL Site," Rev. 0, *Manual 8—Environmental Protection and Compliance*, Idaho Completion Project, February 2004.

ICP-MCP-9439, 2004, "Environmental Sampling Activities at the INEEL," Rev. 0, *Manual 8—Environmental Protection and Compliance,* Idaho National Engineering and Environmental Laboratory, June 2004.

Idaho National Engineering and Environmental Laboratory, "Sample and Analysis Management, Service Authorization, Form, http://webhome4/SampAna/, web page visited July 21, 2004.

Janke, D. H., 2000, *U.S. Department of Energy Idaho Operations Office Idaho National Engineering and Environmental Laboratory Interim Pollution Prevention Plan*, DOE/ID-10333, Rev. 0, U.S. Department of Energy Idaho Operations Office, October 2000.

MCP-62, 2004, "Waste Generator Services—Low-Level Waste Management," Rev. 9, *Manual 17—Waste Management,* Idaho National Engineering and Environmental Laboratory, January 2004.

MCP-63, 2004, "Waste Generator Services—Industrial Waste Management," Rev. 6, *Manual 17—Waste Management*, Idaho National Engineering and Environmental Laboratory, January 2004.

MCP-233, 2002, "Process for Developing, Releasing, and Distributing ER Documents (Supplemental to MCP-135 & MCP-9395)," Rev. 4, *Environmental Restoration Work Processes Manual,* Idaho National Engineering and Environmental Laboratory, June 2002.

MCP-1192, 2003, "Chain-of-Custody and Sample Labeling for ER and D&D&D Projects," Rev. 0, *Environmental Restoration Work Processes Manual,* Idaho National Engineering and Environmental Laboratory, February 2003.

MCP-1194, 2003, "Logbook Practices for ER and D&D&D Projects," Rev. 1, *Environmental Restoration Work Processes Manual,* Idaho National Engineering and Environmental Laboratory, May 2003.

MCP-3002, 2004, "Managing Disturbed Soils," Rev. 5, *Manual 8—Environmental Protection and Compliance,* Idaho National Engineering and Environmental Laboratory, January 2004.

MCP-3480, 2004, "Environmental Instructions for Facilities, Processes, Materials, and Equipment," Rev. 9, *Manual 8—Environmental Protection and Compliance,* Idaho National Engineering and Environmental Laboratory, March 2004.

MCP-9228, 2004, "Environmental Sample Management," Rev. 5, *Environmental Services Administration Handbook*, Idaho National Engineering and Environmental Laboratory, January 2004.

PRD-5030, 2004, "Environmental Requirements for Facilities, Processes, Materials, and Equipment," Rev. 3, *Manual 8—Environmental Protection and Compliance,* Idaho National Engineering and Environmental Laboratory, March 2004.

Appendix A

Sampling and Analysis Plan Tables

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: FIRESTAT-II

SAP Number: DOE/NE-ID-11133

Date: 07/22/2003 Plan Table Revision: 0.0 Project: FIRE STATION II ZONE AND RANGE FIRE BURN AREA Project Manager: WELLS, R. P. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										N7	XJ																		
TR1101	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1102	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1103	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1104	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1105	REG/QC	SOIL	DUP		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	2	2																		
TR1106	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1107	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1108	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1109	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1110	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1111	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1112	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1113	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1114	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1115	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number.

The complete sample identification number will appear on the sample labels.

AT1: Nitroaromatics (8330)

AT2: TNT/RDX

AT3:

AT4:

AT5:

AT6:

AT7:

AT8:

AT9:

AT10:

AT11:

AT12:

AT13:

AT14:

AT15:

AT16:

AT17:

AT18:

AT19:

AT20:

Comments:

The TNT field screening samples will be analyzed according to SW-846 Method 8515

The RDX field screening samples will be analyzed according to SW-846 Method 8510

Analysis Suites:

Contingencies:

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: FIRESTAT-II

SAP Number: DOE/NE-ID-11133

Date: 07/22/2003 Plan Table Revision: 0.0 Project: FIRE STATION II ZONE AND RANGE FIRE BURN AREA Project Manager: WELLS, R. P. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																				
										AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	N7	XJ																		
TR1116	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1117	REG	SOIL	GRAB		6/1/2008	ORD-10	SURFACE SOIL	TBD	NA	1	1																		
TR1118	QC	WATER	TBLK		6/1/2008	ORD-10	QC	TBD	NA	1																			
TR1119	QC	WATER	FBLK		6/1/2008	ORD-10	QC	TBD	NA	1																			
TR1120	QC	WATER	RNST		6/1/2008	ORD-10	QC	TBD	NA	1																			

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number.

The complete sample identification number will appear on the sample labels.

AT1: Nitroaromatics (8330)

AT2: TNT/RDX

AT3:

AT4:

AT5:

AT6:

AT7:

AT8:

AT9:

AT10:

AT11:

AT12:

AT13:

AT14:

AT15:

AT16:

AT17:

AT18:

AT19:

AT20:

Comments:

The TNT field screening samples will be analyzed according to SW-846 Method 8515

The RDX field screening samples will be analyzed according to SW-846 Method 8510

Analysis Suites:

Contingencies:

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: EXPER-FIELDSTA

SAP Number: DOE/NE-ID-11133

Date: 07/22/2004 Plan Table Revision: 0.0 Project: EXPERIMENTAL FIELD STATION Project Manager: WELLS, R. P. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										N7	XJ																		
TR1201	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1202	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1203	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1204	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1205	REG/QC	SOIL	DUP		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	2	2																		
TR1206	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1207	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1208	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1209	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1210	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1211	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1212	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1213	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1214	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1215	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels.

AT1: Nitroaromatics (8330)

AT2: TNT/RDX

AT3:

AT4:

AT5:

AT6:

AT7:

AT8:

AT9:

AT10:

AT11:

AT12:

AT13:

AT14:

AT15:

AT16:

AT17:

AT18:

AT19:

AT20:

Comments:

TNT/RDX = TNT (trinitrotoluene) only

The TNT field screening samples will be analyzed according to SW-846 Method 8515.

Analysis Suites:

Contingencies:

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: EXPER-FIELDSTA

SAP Number: DOE/NE-ID-11133

Date: 07/22/2004 Plan Table Revision: 0.0 Project: EXPERIMENTAL FIELD STATION Project Manager: WELLS, R. P. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																				
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										N7	XJ																		
TR1216	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1217	REG	SOIL	GRAB		06/01/2008	ORD-15	SURFACE SOIL	TBD	NA	1	1																		
TR1218	QC	WATER	TBLK		06/01/2008	ORD-15	QC	TBD	NA	1																			
TR1219	QC	WATER	FBLK		06/01/2008	ORD-15	QC	TBD	NA	1																			
TR1220	QC	WATER	RNST		06/01/2008	ORD-15	QC	TBD	NA	1																			

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number.

The complete sample identification number will appear on the sample labels.

AT1: Nitroaromatics (8330)

AT2: TNT/RDX

AT3:

AT4:

AT5:

AT6:

AT7:

AT8:

AT9:

AT10:

AT11:

AT12:

AT13:

AT14:

AT15:

AT16:

AT17:

AT18:

AT19:

AT20:

Comments:

TNT/RDX = TNT (trinitrotoluene) only

The TNT field screening samples will be analyzed according to SW-846 Method 8515.

Analysis Suites:

Contingencies:

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: LANDMINE-FUZE

SAP Number: DOE/NE-ID-11133

Date: 07/22/2003 Plan Table Revision: 0.0 Project: LAND MINE FUZE BURN AREA Project Manager: WELLS, R. P. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																				
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										N7	TA	XJ																	
TR1301	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1	1	1																	
TR1302	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1303	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1304	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1305	REG/QC	SOIL	DUP		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	2		2																	
TR1306	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1307	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1308	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1309	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1310	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1311	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1312	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1313	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1314	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1315	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels.

AT1: Nitroaromatics (8330)

AT2: TCLP SVOCs

AT3: TNT/RDX

AT4:

AT5:

AT6:

AT7:

AT8:

AT9:

AT10:

AT11:

AT12:

AT13:

AT14:

AT15:

AT16:

AT17:

AT18:

AT19:

AT20:

Comments:

TNT/RDX = TNT (trinitrotoluene) only

The TNT field screening samples will analyzed according to SW-846 Method 8515

The TCLP SVOCs samples will be analyzed according to SW-846 Method 1311/8270

Analysis Suites:

Contingencies:

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: LANDMINE-FUZE

SAP Number: DOE/NE-ID-11133

Date: 07/22/2003 Plan Table Revision: 0.0 Project: LAND MINE FUZE BURN AREA Project Manager: WELLS, R. P. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																					
										AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	N7	TA	XJ																	
TR1316	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1317	REG	SOIL	GRAB		06/01/2008	ORD-24	SURFACE SOIL	TBD	NA	1		1																	
TR1318	QC	WATER	TBLK		06/01/2008	ORD-24	QC	TBD	NA	1																			
TR1319	QC	WATER	FBLK		06/01/2008	ORD-24	QC	TBD	NA	1																			
TR1320	QC	WATER	RNST		06/01/2008	ORD-24	QC	TBD	NA	1																			

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number.

The complete sample identification number will appear on the sample labels.

AT1: Nitroaromatics (8330)

AT2: TCLP SVOCs

AT3: TNT/RDX

AT4:

AT5:

AT6:

AT7:

AT8:

AT9:

AT10:

AT11:

AT12:

AT13:

AT14:

AT15:

AT16:

AT17:

AT18:

AT19:

AT20:

Comments:

TNT/RDX = TNT (trinitrotoluene) only

The TNT field screening samples will analyzed according to SW-846 Method 8515

The TCLP SVOCs samples will be analyzed according to SW-846 Method 1311/8270

Analysis Suites:

Contingencies:

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: OCEANIC-ATMOSPH

SAP Number: DOE/NE-ID-11133

Date: 12/18/2003 Plan Table Revision: 0.0 Project: NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION Project Manager: WELLS, R. P. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										N7	XJ																		
TR1401	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1402	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1403	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1404	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1405	REG/QC	SOIL	DUP		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	2	2																		
TR1406	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1407	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1408	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1409	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1410	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1411	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1412	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1413	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1414	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1415	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number.

The complete sample identification number will appear on the sample labels.

AT1: Nitroaromatics (8330)

AT2: TNT/RDX

AT3:

AT4:

AT5:

AT6:

AT7:

AT8:

AT9:

AT10:

AT11:

AT12:

AT13:

AT14:

AT15:

AT16:

AT17:

AT18:

AT19:

AT20:

Comments:

The TNT field screening scamples will be analyzed according to SW-846 Method 8515

The RDX field screening samples will be analyzed according to SW-846 Method 8510

Analysis Suites:

Contingencies:

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: OCEANIC-ATMOSPH

SAP Number: DOE/NE-ID-11133

Date: 12/18/2003 Plan Table Revision: 0.0 Project: NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION Project Manager: WELLS, R. P. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
										AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	N7	XJ																		
TR1416	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1417	REG	SOIL	GRAB		06/01/2008	ORD-08	SURFACE SOIL	TBD	NA	1	1																		
TR1418	QC	WATER	TBLK		06/01/2008	ORD-08	QC	TBD	NA	1																			
TR1419	QC	WATER	FBLK		06/01/2008	ORD-08	QC	TBD	NA	1																			
TR1420	QC	WATER	RNST		06/01/2008	ORD-08	QC	TBD	NA	1																			

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number.

The complete sample identification number will appear on the sample labels.

AT1: Nitroaromatics (8330)

AT2: TNT/RDX

AT3:

AT4:

AT5:

AT6:

AT7:

AT8:

AT9:

AT10:

AT11:

AT12:

AT13:

AT14:

AT15:

AT16:

AT17:

AT18:

AT19:

AT20:

Comments:

The TNT field screening scamples will be analyzed according to SW-846 Method 8515

The RDX field screening samples will be analyzed according to SW-846 Method 8510

Analysis Suites:

Contingencies:

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: NAVAL-ORD

SAP Number: DOE/NE-ID-11133

Date: 07/21/2004 Plan Table Revision: 0.0 Project: NAVAL ORDNANCE DISPOSAL AREA Project Manager: WELLS, R. P. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																				
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										N7	BE	XJ																	
TR1501	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1	1	1																	
TR1502	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1503	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1504	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1505	REG/QC	SOIL	DUP		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	2		2																	
TR1506	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1507	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1508	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1509	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1510	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1511	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1512	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1513	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1514	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1515	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels.

AT1: Nitroaromatics (8330)
AT2: TCLP Lead
AT3: TNT/RDX
AT4:
AT5:
AT6:
AT7:
AT8:
AT9:
AT10:

AT11:
AT12:
AT13:
AT14:
AT15:
AT16:
AT17:
AT18:
AT19:
AT20:

Comments:
TNT/RDX = RDX (cyclotrimethylene trinitroamine) only

The RDX field screening samples will be analyzed according to SW-846 Method 8510.

Analysis Suites:

Contingencies:

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: NAVAL-ORD

SAP Number: DOE/NE-ID-11133

Date: 07/21/2004 Plan Table Revision: 0.0 Project: NAVAL ORDNANCE DISPOSAL AREA Project Manager: WELLS, R. P. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																				
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										N7	BE	XJ																	
TR1516	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1517	REG	SOIL	GRAB		06/01/2008	ORD-06	SURFACE SOIL	TBD	NA	1		1																	
TR1518	QC	WATER	TBLK		06/01/2008	ORD-06	QC	TBD	NA	1																			
TR1519	QC	WATER	FBLK		06/01/2008	ORD-06	QC	TBD	NA	1																			
TR1520	QC	WATER	RNST		06/01/2008	ORD-06	QC	TBD	NA	1																			

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number.

The complete sample identification number will appear on the sample labels.

AT1: Nitroaromatics (8330)

AT2: TCLP Lead

AT3: TNT/RDX

AT4:

AT5:

AT6:

AT7:

AT8:

AT9:

AT10:

AT11:

AT12:

AT13:

AT14:

AT15:

AT16:

AT17:

AT18:

AT19:

AT20:

Comments:

TNT/RDX = RDX (cyclotrimethylene trinitroamine) only

The RDX field screening samples will be analyzed according to SW-846 Method 8510.

Analysis Suites:

Contingencies: